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Assistant Editor: A. R. PARKES, M.I.B.F.

Commercial Editor: P. E. CARDEN.

Advertising Manager:
F. BARRINGTON HOOPER, B.A.

Production Manager:
R. J. LOVELL

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District Representatives:
G. P. ELLIOTT (Northern Area)

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JOHN ADAM HOUSE,
17-19, JOHN ADAM STREET,
ADELPHI, LONDON, W.C.2

Telephone: Trafalgar 6171 (Private Branch Exchange)
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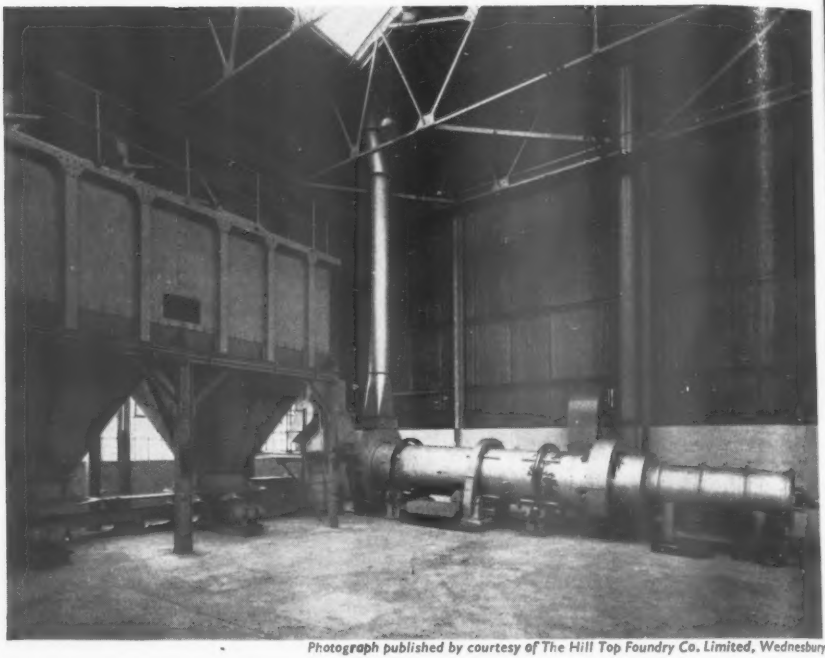

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A Large Ironfoundry with CORE SHOP PLANT by

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Photograph shows:
A section of the Core Shop Plant in a Large Ironfoundry. Two large Rotary Storage Hoppers feed the Wet Sand on to a Belt conveyor and then to a Belt and Bucket Elevator to the Gas Fired Rotary Sand Drier. The dried Sand is then Pneumatically conveyed to Large Storage Hoppers in the Mixing Section.

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Belgium and the Common Market

Mr. J. Goffart recently addressed Fabrimetal, the Belgian Employers' Association for metal manufacture, on the impact of the Common Market on the Belgian foundry industry. He esteems this to be so profound that he says the only alternatives are reorientation to meet the new conditions or to commit suicide. He insists that the cost of labour in Belgium is the highest in all Europe and that whilst Belgian foundrymen are extremely highly skilled, this combination is not a sound basis for counteracting foreign competition. No real effort has so far been made in Belgium to meet the needs of the new economy, such as the tightening up of specifications, quality improvement, research on low-price operation, the need to respect contract clauses or, in particular, improving deliveries. These, Mr. Goffart believes, have placed the Belgian founder in a perilous position at the opening of the Common Market.

Since the address was given, an American motor-car assembly plant in Belgium has been closed down, involving, if we remember correctly, the dismissal of 300 operators; the work they carried out will be transferred to Holland. Of course, under the Rome treaty, the operators have the right to work in any of the countries included in the Economic Union, but translated into practice this does not mean much for the worker, though it does make opportunities for the specialized technologist. At present, Mr. Goffart's fear is for the small- and medium-size foundry. Already, competition from Dutch foundries making domestic appliances is being felt. The problem for the Belgian founder is sudden enlargement of his markets and the opening of his domestic market to increased competition. Mr. Goffart rightly urges a much increased co-operative activity for buying, research, publicity, apprenticeship and other activities, as, individually, most Belgian foundries are too small.

All that Mr. Goffart has said is very important to the British foundry industry, as it may be faced with similar problems in the future, when the larger works of the Continentals will have adapted themselves to the enlarged conditions of to-day. Then, like the Belgians, we will probably have the alternatives—to use Mr. Goffart's expression—of "*Adaptation ou Hara-Kiri.*"

Social Functions

DINNER: METALLURGISTS REUNION

Last Friday, ex-students of the Metallurgical Department of the University of Sheffield dined together in the Firth Hall under the chairmanship of Professor A. Quarrell. The toast of "The Department" was proposed by the vice-chancellor. Dr. J. M. Whittaker, F.R.S., and replied to by Major F. Orme, T.D., M.MET., who is shortly retiring after spending the whole of his adult life in the Department. "The Guests" was proposed by Professor R. W. K. Honeycombe, and the response was by Professor F. C. Thompson, D.MET., who also is shortly retiring from the Chair of Metallurgy at Manchester University. This post is to be taken by Mr. C. R. Tottle, another Sheffield graduate.

The "works" laboratory is well equipped to give a practical background to foundry practice or "the metallurgy of cast metals." There is a modern cupola, moulding machines and drying ovens. The CO_2 Process and shell moulding are carried out, the latter process being used by the students to make ash-trays bearing the coat of arms of the University.

DINNER: IBF EAST MIDLANDS BRANCH

Informality was the keynote of the annual dinner and dance of the East Midlands branch of the Institute of British Foundrymen, held in the Midland Hotel, Derby, last Friday. It was attended by about 100 members, guests and their ladies, with Mr. J. W. Gardom, the president of the branch, in charge of the arrangements, ably assisted by Mr. H. P. Millar and Mr. W. H. Smith as Masters of Ceremony. Following the reception at 7.30 p.m., there was a buffet meal, for which two sittings were arranged, an outstanding feature being the abundance, variety and lavish decoration of the food set out as a "cold table" for the diners. Amongst the guests were Mr. A. E. Peace, president of the Institute, with Mrs. Peace; the national secretary, Mr. G. Lambert, with Mrs. Lambert, as well as prominent representatives of practically every other branch of the Institute. The evening continued with dancing until 1 a.m., there being no formal speeches.

"AT HOME": J. W. GARDOM

Following the function reported above, Mr. J. W. Gardom, president of the IBF East Midlands branch (and a past national president of the Institute, and also of the London branch) was "at home" to prominent IBF personalities and other personal friends, and their ladies, on Saturday. On this occasion, approximately 60 people assembled at Park Lodge, Ripley, where refreshments and luncheon were served. The guests included no fewer than five past-presidents of the Institute (Mr. C. W. Bigg, Dr. J. E. Hurst, Dr. C. J. Dadswell, Mr. H. J. V. Williams and Mr. J. Blakiston), in addition to the president, Mr. A. E. Peace, the senior vice-president, Mr. C. H. Wilson, and the secretary, Mr. G. Lambert. Nearly all these were accompanied by their ladies.

ABBF EVENING

The annual social evening of the Association of Bronze and Brass Founders was held on Tuesday of last week—that is the day preceding the annual general meeting. It took the form of a cocktail party in the Savoy Hotel, London, when the retiring president, Mr. P. B. Higgins, and Mrs. Higgins welcomed members and guests as they arrived. At the conclusion of this section of the proceedings almost the whole party (about 165) proceeded in taxis to the Drury Lane Theatre where they saw a performance of "My Fair Lady." The members of the party who were unable to be accommodated at Drury Lane went to the Savoy Theatre instead, and both parties reassembled at the Savoy Hotel for supper and dancing after the shows. The secretaries are to be congratulated on organizing a most successful function, and credit must also be accorded to the Association's representative who managed to secure so many seats at the theatre performances.

Visit to Thames Foundry

There are still some vacancies for the Association of Bronze & Brass Founders' visit to the Ford Motor Company's Thames Foundry on Tuesday, May 12, and if any founders in the London area wish to join the party, they will be very welcome. Applications should be sent to Mr. W. R. Buxton, Eyre Smelting Company, Limited, Tandem Works, Merton Abbey, London, S.W.19; the charge is expected to be about 30s. The trip starts at Charing Cross Pier at 11 a.m., includes lunch on the launch with a running commentary on the river trip. The return will be by boat at 3.45 p.m., reaching Charing Cross Pier at 5.30 p.m.

Introducing the Author. . .

Mr. C. A. Sanders, whose article on European Foundries begins on page 525, is vice-president of the American Colloid Company. He has studied ceramic engineering at Ohio State University, and mechanical and metallurgical engineering at Michigan State University and Massachusetts Institute of Technology. He is a present national director of the American Foundrymen's Society and a past recipient of the AFS John H. Whiting Gold Medal. He has held almost every committee chairmanship within the AFS Sand Division, and was the first to succeed the late Dr. Ries as chairman of the Division. He has appeared before every chapter within the United States and Canada and has lectured in Europe. His numerous papers and articles have appeared in trade publications for many years and he has prepared several foreign exchange papers. His "Foundry Sand Practice" is now in the 4th edition, and his monthly "Newsletters" and "Brief Notes for Busy Foundrymen" have influenced and encouraged many of his fellow foundrymen. It is expected that Mr. Sanders will be one of the official AFS delegates to the forthcoming International Foundry Congress in Madrid, next October.

A FOUR-DAY exhibition illustrating the properties and uses of nickel and its alloys is to be staged by Henry Wiggin & Company, Limited, at Park Lane House, 45, Park Lane, London, W.1, from May 12 to 15. Throughout the period of the exhibition the company's technical service staff will be available to answer visitors' queries and publications covering the company's products will be available. The exhibition will be augmented by film shows and a series of lectures given by independent speakers from industry and government departments.

An American looks at European Foundries

By C. A. Sanders

In view of the renewed interest which has been shown in what America thinks of Europe's industries, it has been decided to reproduce an abstract of Mr. Clyde A. Sanders' report, "What European Foundries are doing," which describes his tour of the Continent. The illustrations are not referred to specifically in the article, but it is felt that they enhance it's value. Particulars of the author's career, and his portrait, appear on the facing page.

The same wide disparities exist, in some respects, between the foundries in different European countries as between foundries located in different areas in North America. The frontier barrier is ever present, and hides many technical advancements; the size, traditions, geographical position and language of each Continental country determines much of its foundry practice. Only general observations may be offered when one realizes the range and diversity of problems peculiar to each country—the statements made in this paper in no way reflect the trends of *every* foundry in Europe.

Research and Development

There appears to be more *national* research and development data available in North America than in Europe, but more *individual* foundry research is done on the Continent. On the western side of the Atlantic there is a great deal of free technical literature and information available to all foundrymen, whereas the results of many research problems in Europe are often available only to that company, or companies, sponsoring the research. Most European companies employ a technical staff of high calibre, and many foundry laboratories in Europe are far ahead of their North American counterparts. The European laboratory strives for perfection, whereas Americans try too much to hasten projects toward the production stage. Chemists and chemical engineers are gradually replacing metallurgists in certain European technology. In the making of iron and steel, for example, the chemist deals with chemical-reaction rates, heat-transfer mechanisms, thermodynamics, and kinetic studies.

Important Role of Electricity

When visiting foundries in Europe, one cannot help but notice the many electric furnaces. Direct-arc and indirect-arc and induction-furnaces are used by all types of foundries. For Americans, accustomed to using coal, coke, gas or oil, it comes as quite a surprise to learn that in Europe, particularly in Scandinavia, electricity comes first in transportation, home economy and industry. Coke is too dear in many of the countries, and electric-powered furnaces are consequently more economical. In certain areas, the *per capita* use of electricity exceeds that of North America. The American must be cautious in comparing cost figures without first understanding local conditions. The relative abundance of available water-power in certain mountainous European countries has led to hydro-electric development on a very large scale.

Melting

Great emphasis has been placed on metallurgical developments in Europe. However, there is a reluctance to put any new research development into production too rapidly. Many wonderful achievements in metallurgical technique seem to have been completed, but are not in production as yet. The casting of chrome, nickel, molybdenum and copper alloys for liners is well developed in Europe, many of these liners being exported to North America. Induction-melting is used to control these alloys, with rigid supervision.

Grey Iron

In grey-iron foundries, it was noticed there has been a great deal of attention paid to re-siting cupolas and other furnaces to obtain maximum efficiency. To obtain a more flexible and smoother melting operation, a change in permanent gangways for servicing melting units is being accomplished. Some of the most up-to-date melting practices were observed where water-cooled cupolas were in use. Hot-blast, no refractory linings, and weighed charges, are in common use, and excellent pouring rates are achieved. Melting departments are usually under the supervision of a well-trained metallurgist, who has full knowledge and control over operations.

Steel

The L-D Process is in use. This method produces steel from molten pig-iron and scrap by blowing pure oxygen onto its surface. Although akin to the Bessemer Process, the L-D Process is different in that pure oxygen is used instead of air, the oxygen being blown against the top surface rather than from the bottom. It is claimed that this patented process requires about one-half the capital investment taken by conventional open hearths. The liquid pig-iron from the blast-furnace is placed in a pear-shaped vessel with approximately 25 per cent. scrap steel. Pure oxygen is

[Courtesy: Geo. Fischer, Limited.

Flowability-testing equipment in current use in some European foundries.

blown against the surface of this hot metal, burning out the carbon and silicon and reducing the other alloys present. It requires about 22 minutes of blowing for a 60-ton melt to be converted to steel. This permits the manufacture of smaller melts than those from modern open hearths. Any type steel may be made in this manner, and alloying is done at the ladle. In Europe this process is being use for making low-alloy steels.

Induction Furnaces

There is no question but that Europe is far ahead of North America in developing induction-furnace melting techniques. When these furnaces are lined a flat cold-rolled steel plate is formed to the correct inside-diameter and set into the furnace. A refractory monolithic lining is then rammed between the steel plate and a sturdy water-cooled coil held in a rigid frame of magnetic and structural steel. The induction furnace is charged but the steel form is not removed. The refractory lining is strengthened by melting the steel form into it. Outstanding results are obtained in these furnaces. As the current is applied, and heat generated, a vigorous electromagnetic stirring occurs in the liquid metal. Integrated electric controls regulate the power, and maintain a high power-factor automatically.

Vacuum Melting and Degassing

All large European companies are experimenting with, or actually using, vacuum-arc melting, or some form of vacuum degassing. Cleaner and better density of metal is claimed. Less slag and non-metallic inclusions are likely with this form of melting practice. Progressive Europeans give as much attention to degassifying metal as they do to deoxidizing. The reason that vacuum-melting and degassifying is becoming more prominent in Europe is that improved properties of the metal are obtained. It is believed that the oxygen and nitrogen in the atmosphere are removed from the presence of the molten bath, thus minimizing the occurrence of a gas-metal reaction which forms oxides and nitrides at the bath surface. Reactions with gaseous products can be more nearly completed in a dynamic vacuum system, which is a continuously-pumped system. Gaseous deoxidized products can be pumped away rather than separated by slags, which prevents metallic inclusions. Higher densities improve mechanical properties at all temperatures, and exceptionally clean metal results when the same metal is degassified under a vacuum. High-frequency vacuum-melting is producing satisfactory steels.

Arc-melting

Arc-melting in chilled crucibles is becoming more important in producing sound castings. Arc-melting is being applied with inert atmospheres and non-consumable electrodes, as well as with consumable electrodes. The most successful vacuum-arc melting seemed to be with consumable electrodes in vacuum. Much technical information has been obtained on the behaviour of high-current arcs at reduced pressures. This type of melting may be applied to any number of alloys, superior metal properties being claimed.

Vacuum-stream Degassing

Vacuum-stream degassing is another new European technique which is being initiated at several technically-advanced foundries to produce hydrogen-free metal. An empty ladle is placed in a vacuum-chamber, and the pressure reduced to about 20 mm. Metal is tapped in the conventional bottom-pour ladle, where the pouring nozzle of the ladle is positioned within an air-tight gasket on top of the vacuum-chamber. The support-rod is raised so that molten metal falls on an aluminium diaphragm which melts, thus permitting the steel to enter the vacuum chamber. Because of the large surface-area of steel exposed to the vacuum, the degassing is very rapid. Hydrogen content is reduced by approximately 50 per cent., and a considerable quantity of oxygen and nitrogen gases are also removed from the steel. After the transfer is completed, the degassed steel is removed from the vacuum-chamber and the castings are poured. The advantages of this practice are: lack of micro-shrinkage, better fatigue-life, fewer non-metallic inclusions, and improved ductility. Several vacuum-degassing units have been installed recently in the United States.

Special Melting Techniques

Europeans are extremely interested in heat- and corrosion-resistant alloys. They are constantly investigating "cermets," a combination of powdered-metal and ceramic particles which gives the heat-

resistant characteristics of ceramics plus the strength and ductility of metals. Such heat-resistant alloys are used in vacuum-tubes, rockets and certain industrial applications. Certain metals are being zone-refined to purify them for use in jets and missiles. As the metal passes through a heating-coil, it is melted from bottom to top. Impurities diffuse upwards into the heated zone, leaving behind ultra-pure metal with better mechanical properties. Even the cyclotron is providing research for radioactive materials, which are used as tracer elements, and in other important projects.

Levitation-melting is used to prevent contamination of metals such as titanium and molybdenum. Alloys are placed within an induction-coil, where an electro-magnetic field holds the alloy suspended in mid-air while induced currents melt the alloy. A high state of purity can be achieved, since the molten metal does not make contact with the crucible.

One of the most fascinating observations was the vaporizing of tungsten with a carbon arc. Metallic surfaces may be impregnated with the tungsten vapour, producing a remarkably hard surface. Welding under a plastic cover, which contains various inert gases, has led to the elimination of the fear of burning, oxidizing, flaking or hairline cracks in metal-castings.

Vibration Techniques

Vibration techniques such as sonics and ultrasonics are being developed. These waves or vibrations are generated by various types of equipment, and may be propagated in metals at various frequencies and intensities so as to accelerate solidification, degassing, etc. A number of manufacturers are known to have developed supersonics, and ultrasonic frequencies of 500,000 kc. are in experimental use.

Supersonic Reflectoscopes

Supersonic reflectoscopes, which are based upon the tendency of quartz and other piezo-electric crystals to vibrate at high frequences when they are energized by the terminals of a radio-frequency amplifier, are being used. In Europe, reflectoscope vibrations are generated at frequencies which correspond with the resonance properties of various metals. These waves may be reflected through the solids or liquids in the same way as light is reflected from a mirror.

Magnetostriction Generators

Magnetostriction generators are being used to produce ultrasonic energy. These generators produce supersonic vibrations so rapidly and intermittently that they polarize electromagnets. Vibrations thus produced may be transferred to a bar or tube. They are in the low range of supersonic frequencies, being about 20 to 100 kc. Such generators are also used to degas molten metal, since they do prevent separation of certain metal crystals when solidification occurs. It was noted that supersonics are also being used in certain cleaning and welding processes.

Magnetic Vibrators

Work is also being done to cleanse as well as densify metal, at vibrations of 60 to 1,500 cycles per sec. These vibrations are produced from a magnetic vibrator, as well as a 20-kc. frequency from a magneto source of vibration. Such vibrations decrease the size of stable nuclei during solidification, and certain European investigators have claimed there is a definite improvement in the detailed surface of castings if an increase in the apparent fluidity is developed by vibration techniques. This experimental work was done by magnetostriction transducers, electro-dynamic vibrations being produced by superimposing a magnetic field on molten metal in a high-frequency induction furnace, or by vibrating a mould or ladle containing the metal. Dissolved gases are decreased, and metals degassed by vibration in a vacuum are claimed to be superior to other similar metals. One undesirable segregation frequently associated with a coarse dendritic structure is changed to a fine, as-cast, grain structure when vibrations are applied. Segregation that may occur during solidification is greatly improved with frequencies of 60 c. to 20 kc. per sec.

Much knowledge is being gained of the vibration of gravity-die-casting, investment and ceramic

Final coring-up of a mould for a hydraulic shear-frame casting.

[Courtesy: English Steel Corporation, Limited.

moulds. It is claimed these forms of moulding are more receptive to vibration technology than sand moulds. The high amplitudes associated with low-frequency vibrations may shatter a conventional green-sand mould, whereas the lower amplitudes of ultrasonic frequencies could perhaps be utilized with green sand without such dangers. The scientific work already done indicates that vibrations may be best within the ladle, rather than within the mould, and many companies are investigating the application of lower-amplitude ultrasonics to the gates, heads and risers of castings. One European technique in casting steel is the elevation of the flasks. These flasks are tilted at a 5 deg. angle on a vibrator platform, and lightly vibrated as the moulds are poured. The platform on which the vibration is done rests on four springs, and the vibration is developed by an eccentric weight mounted on a motor-driven shaft turning at approximately 1,440 r.p.m. It is claimed that porosity, shrinkage, cracks and micro-shrinkage are in many cases diminished after vibration and the castings are claimed to have improved pressure-tightness. It is the opinion of the author that vibration techniques will grow in use, since European experiments indicate outstanding progress.

Pattern Design

In contrast with American foundries, the majority of European foundries attempt to settle most production problems in the patternshop. In general, European administration staff are more concerned with planning in the patternshop than corrections in the foundry. It appears that the pattern foreman influences management more than the foundry supervisor. Patterns are modified as required to aid production problems. In certain cases, it was observed that the foundry did not have as close a liaison with the customer as the patternshop, and all ills seemed to be cured in the patternshop. In the USA the patternshop is not as close to management, and it is more common to depend on outside patternshops to produce patterns for the foundry.

Automation at George Fischer's

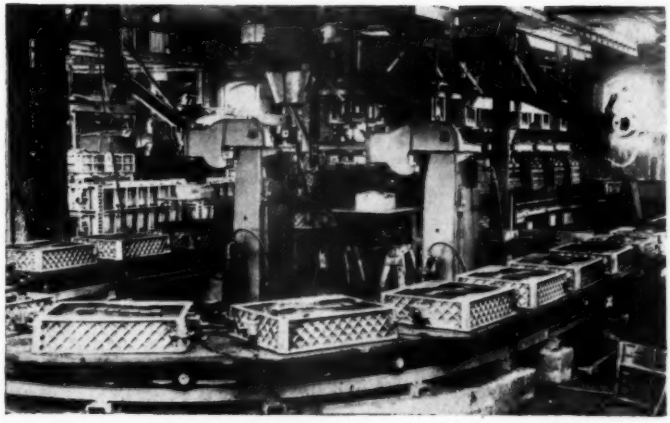
American foundrymen are often guilty of bragging about the high productivity achieved in US foundries. However, one foundry they could hardly equal is the George Fischer, Limited automatic foundry in Schaffhausen, Switzerland. In this malleable foundry, automatic moulding-machines produce approximately 300 moulds per hr.! The flask size used is 22 by 27 in., 6 to 12 in. in height, and the patternplate is approximately 600 sq. in. in area. There is a completely automatic system for adding both facing and backing sand to flasks. The copes and drags are automatically jolted and squeezed and passed to the conveyor stations without the aid of a moulder. There, the cores are set manually. The number of hands at this station depends on the number of cores to be placed in the drag. The flasks are closed and weights automatically placed on them before they pass to the automatic pouring-conveyor station. It was fascinating to watch ladles travel parallel to the conveyor line, find their place under the reservoir holding-ladle, and gear themselves automatically into the conveyor system ready for pouring. Metal is weighed as it is tapped into ladles, and rapid pouring at a constant height above the mould is made possible by a planetary system of ladle mounting. After the moulds are poured, they pass to the cooling area, where shakeout time is varied by an ingenious rollover conveyor system. Only nine men are needed to operate this amazing mechanized foundry.

Heavy-duty oxy-acetylene cutting machine removing a head 3 ft. 9 in. thick. The machine works automatically after being set-up on its track.

[Courtesy: F. H. Lloyd & Company, Limited.

Mechanization

New equipment is gradually being introduced into the European foundries, but many companies have not been fully convinced that such equipment will solve their problems. It seems that the European has yet to recognize the full possibilities of the sandslinger and core-blower; because there is an abundance of craftsmanship, some companies have not taken advantage of these work-saving devices. An exception to this is



Snap-flasks on two automatic jolt-squeeze pin-lift moulding machines in a European foundry.

[Courtesy: Escher-Wyss Maschinenfabrick G.M.B.H.

the use, by F. H. Lloyd & Company, Limited, Staffs., of small sandslingers to ram cores with oil or clay-bonded sand. Each slinger serves two roller-conveyors, and the corebox, complete with iron, is delivered to the slinger from the rear. The rammed box moves forward for stripping. This practice saves as much as 75 per cent. of the time taken by conventional ramming. Where mechanization has been adopted, it appears to be equal to any American installation, and receives more maintenance.

Sand Handling

Most smaller European foundries have realized that, if they pay full moulder's wages, they must make sure that the moulder does not have to do common labouring. Some European foundries visited had elaborate sand-handling equipment. One in particular had more dust-control equipment around its sand-conditioning plant than ever seen in US foundries. The plant was spotless and not a single man was to be seen on the sand-handling platform. The operator was actually located in an air-conditioned room, and sat before a large control-panel which showed the location of all sand and raw materials as they passed through the system. The operator could mill a batch of moulding sand and transport it to any location in the foundry quickly and efficiently. As in North America, there is not enough sand storage in European foundries. Perhaps money is spent on moulding machines and production equipment before the need for ample sand storage is considered. Lack of hopper capacity is the chief reason for undesirably hot sands in North American foundries. This shortcoming is, however, being recognized and rectified in recent European installations. Many monorail sand-systems are employed in Europe for delivering sand to moulding stations, but servicing the moulding production stations adequately is still a problem to be solved. Pneumatic sand-handling is not yet popular. Sand-reclamation equipment is used in only a few large mechanized shops, since productivity equipment is given preference over reclamation equipment.

Moulding and Moulding Sands

The European foundry uses more naturally-bonded sand than the average North American foundry. Even many of the Continental steel foundries are still utilizing naturally-bonded sands. Their steel-casting success is due to the considerable attention given to the mould, and a great amount of nailing and coating is nearly always required.

Loam moulding is widely used for large cylinders and pipes. A brick framework is added to the rear of the loam and sweeps are used to form the mould contour. Chopped straw is added to help eliminate sand-expansion defects, and to overcome certain surface defects—many chill nails are used. The European tends to use a lot of dry sand, since he reasons that it is safer and a better guarantee of a good casting. Moulding is expensive, he says, and should not be repeated, and he regards dry-sand moulding as a form of insurance.

Sand used for synthetic mixtures is usually stained with a natural iron-oxide. This does not condemn the sand, but rather improves its working qualities on certain castings, and saves money in purchasing iron-oxide. Most of the leading European foundries that employ synthetic-sand mixtures claim that better results are obtained when the moulding sand is used at room temperatures. Devices using water and air to cool and dry system sand are popular. Many founders use green compression strengths above 10 lb. per sq. in., measured with standard European equipment. Most mixes have permeabilities of less than 50 ml. per min.

On the average, European foundries use more new sand than North American foundries. They claim that it is safer to really ensure that the pattern is well covered with new facing-sand when making the mould. Contrary to certain opinions in the USA, one successful European foundry uses a base sand that contains as much as 25 per cent. felspar. It is a compounded sand grain, and absorbs as much as six per cent. water for proper temper. With six per cent. coal-dust and six per cent. bentonite, it produces a casting as faultless as the writer has ever seen. Many foundries are vacuuming the mould instead of blowing it out with an air hose. Fewer inclusions in the metal, as well as less damage to the mould surface, result thereby.

Olivine Sand—Zircon Sand

In certain Scandinavian countries, olivine sand is in use, but not to any great degree. It appears

[Courtesy: F. H. Lloyd & Company, Limited.

Dust-extraction device fitted to a stone-mason's glove in a foundry in England. The head of the suction-pipe is located near to the chisel point, to enable the dust to be removed at the source. This device is used particularly at the rough-dressing stage, after Hydroblasting.

that zircon sand is a superior product. Evidently silica sand is as good as olivine, and might be preferred if there were no health laws and controls on the use of silica sand. However, where manganese steel is cast, olivine sands are doing a capable job. Economics again is the deciding factor in this selection. Zircon sand is used chiefly in the casting of steel.

Other Activities

Europeans favour naturally-bonded sand, fireclays and bentonites as moulding-sand binders. Some European calcium bentonites are treated with various alkalis, and are being substituted for the Wyoming bentonites. Where they work properly, they are considered to have an economic advantage over Wyoming bentonites. Some foundries, however, state this is false economy and do not care to use treated bentonites.

Not as much iron-oxide is used in Europe as in North America, but more dextrine is used than cornflour. Lignin-sulphite liquors and other waste products from the paper industry are also popular. Few of the unknown compounded foundry materials are added to moulding sands, but certain ground coal-dusts, blended with clay, are being used.

Compo and Chamotte Moulding

When an American visits Europe and knows that most moulding processes originated in Europe, he expects to see them in operation. The Randupson cement process, compo moulding, chamotte moulding, the Croning Process, the lost-wax process, investment moulding, the CO_2 Process, and numerous others originated in Europe, but they are not as widely used as in North America. Only chamotte and compo moulding are really in evidence, and are used throughout Europe in the production of large steel and grey-iron castings. Both compo and chamotte generally replace naturally-bonded sand for the casting of heavy work, principally in the steel foundry, since they seem to be less sensitive to thermal shock from molten metal.

Compo, in general use, is composed of approximately 70 per cent. crushed firebricks, 15 per cent. crushed chamotte grog, 14 per cent. ground plastic fireclay and one per cent. foundry blacking. A high-temper water is added, equalling approximately 10 per cent. by weight.

Chamotte is usually a bauxite clay that has been pre-fired and calcined at about 1,450 deg. C. The refractory chamotte has a low apparent-porosity. The chamotte grog should not break down into fines during crushing. It is screened and handled in the same way as silica sand is handled in North America. Sand distribution is carefully considered in the preparation of this aggregate.

Mechanical properties specified for foundry use are similar to those of silica-sand mixtures. Permeability is usually over 100, green compression-strength usually over 10 lb. per sq. in., dry compression-strength generally over 200 lb. per sq. in. All moulds made with these materials generally receive a chamotte or aluminium coating. The chamotte coatings vary, but are usually 80 per cent. chamotte fines bonded with 10 per cent. plastic fireclay. Certain other additives are used, such as lignin-sulphite liquors. The best alundum mould-paint seen by the author was one containing 110 lb. of alundum fines, 18 lb. of ground plastic fireclay, 2 lb. of Western bentonite and 2 lb. of dextrine, with water to suspend. Approximately 8 to 10 gall. of water were used. This ceramic type of moulding should be further considered by North American foundries for casting certain large steel or grey-iron castings.

CO_2 Process

A considerable amount of CO_2 moulding is being employed, probably more so than other of the new methods. In common use are two new automatic CO_2 machines, which blow and gas-set the cores automatically. Always economy-conscious, the European has developed a unique technique in which a vacuum, or partial vacuum, is created in the core- or mould-boxes prior to gassing. After CO_2 treatment the excess gas is recovered. This practice is economic, and hardens the core more uniformly.

Shell Moulding

While visiting Düsseldorf the author noticed

that a Congress was being held for Croning Process licensees; some 150 foundrymen from six countries were attending. Opinions on shell moulding expressed by those present were (*a*) It is a good method for casting complicated patterns; (*b*) any method which eliminates one or two cores should be considered; (*c*) for complicated castings such as air-cooled cylinders with deep fins, that normally might be made in an oil-sand core, it is worth adopting, and (*d*) unless it eliminates 100 per cent. machining in certain critical areas, it might be too expensive. The shell-moulding process is used most widely for coremaking. Royalty charges probably prohibit more Continental foundries from accepting this process. The European is sensitive to economic conditions that affect casting costs, and considers possible effects on the selling price of the casting very carefully.

Sand Control

The European is more inclined to treat sand-control as a tool of research and development, whereas the North American controls production directly from the sand laboratory. There are exceptions to this statement, as some of the larger operating foundries in Europe have actually developed their own sand-testing equipment. A test widely accepted in Europe is the shatter-index test. Organic binders rapidly increase the plasticity and therefore affect the shatter index considerably. There are much data established between shatter-index test, sand grain-size, grain-size distribution and other compaction data.

Only a small percentage of European foundries use pop-off flasks or snap flasks. Tight metal flasks are being used instead. These flasks are so strong, and so heavy, that handling tires the moulder. In many cases heavy steel flasks can only be manipulated by two operators when assembling the mould. Most flasks are cast from the metal being poured in the foundry. Not enough perforated-metal flasks or lighter-alloy flasks are in use.

Flasks and Bottom Boards

The thin slip flask is not widely used in Europe. Tapered boxless moulding is considered to be too complicated. There is usually not sufficient room to handle a large number of moulds, so tight flasks are preferred. Several Continental companies are employing old rubber tyres to roll over heavy flasks, and to prevent the moulds from being mishandled. Rubber tyres appear to act as a better cushion than wooden posts, and they also last longer.

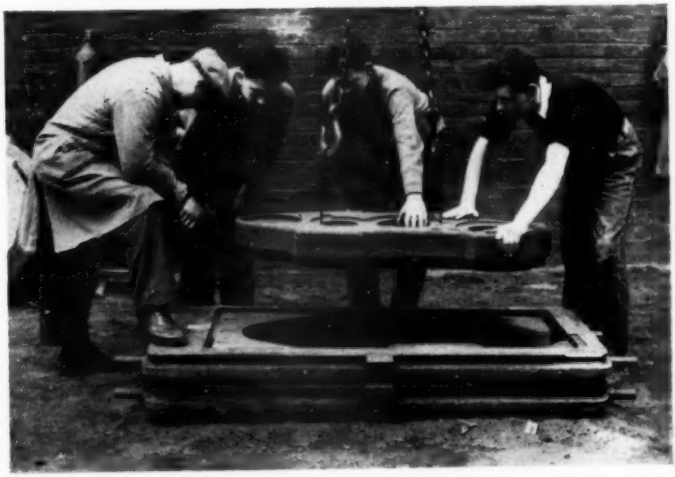
Several economy-minded European foundries are protecting bottom boards by painting them with various solutions. To prevent burning of wooden bottom boards, sodium silicate is painted on, and while it is still wet, a very light coating of fine silica sand or silica flour is dusted over it. Drying bonds the refractory protective coating to the surface of the boards. On larger flasks, certain foundries have made bottom boards from angle iron. Half-inch angle-iron strips are welded approximately 1 in. apart to an outside border of 1-in. angle-iron. These steel-bottom boards are easily stacked and have an excellent service life.

Exothermic Compounds

The European is naturally thrifty, so the author was not surprised to find considerable attention being paid to riser weight. In many cases, steel-casting risers are kept at a minimum by incorporating various exothermics. Not only is better yield obtained with a more pronounced use of exothermics, but, by the reduction of riser weight, less ferrostatic pressure is involved, and consequently less metal penetration in the drag side. Exothermic compounds appear to be in greater use in Europe than in North America.

Heat-treatment

The progressive European foundry has learned to do its own heat-treatment and not to depend on outside sources. Thus, foundries which have installed modern heat-treatment equipment have gained customers, and perhaps increased dollar sales. Quality has been improved, and a better relationship exists between customer and foundry where heat-treatment is done by the foundry. Some foundries have separated the heat-treatment from the foundry and have allowed each to bear individual costs, and often have the fettling- and



Instructor discussing foundry practice with apprentices at a Scottish foundry, showing them the technique and craftsmanship required.

[*Courtesy: Bonnington Castings, Limited*

rough-machining shops under the same roof as the heat-treatment plant.

Alloy Additions

Many ferro-alloys are added to the ladle by first placing in a pressurized container, and then inundating with inert gas before discharging through a sealed tube directly into the ladle containing the metal to be alloyed. Alloy recovery is then excellent. Several economically-minded European foundries have built a lid that seals directly to a ladle containing the hot metal. In the centre of such a lid is a refractory pipe, which houses a steel pipe connected to a refractory cage. This refractory cage may be a perforated graphite cup, or wire net that has been dipped into a refractory coating for protection against insertion into the hot metal. The alloying elements are placed in this refractory cage by dropping through the refractory pipe connected to the lid. The metal for alloying is then brought to the proper station, and the lid containing the caged alloy is attached firmly to the ladle, thus forcing the alloying elements deep into the ladle. As the hot metal penetrates the cage, the ferro-alloy is absorbed and blends homogeneously into the metal. Maximum recovery is obtained in this way.

In Europe, ductile or nodular iron is known as "s.-g. iron." One of the newer techniques for adding magnesium to make s.-g. iron is known as the S-K-B, or Schuchtermann & Kremer-Baum, Process. Pure magnesium is added to a sealed ladle, which prevents loss of alloying metal and eliminates the need for other metals combined into a master alloy.

Automatic pouring device (Buhrer method) in operation at the Geo. Fischer foundry, Schaffhausen, Switzerland. 300 moulds per hr. may be poured automatically—no manpower is involved at all.

[Courtesy: Geo. Fischer, Limited

Casting Steel Valves

It is usually unwise to select only one casting for comment, but because the writer found such a variety of steel-valve casting practice in Europe, a comment is ventured. One stainless-steel valve which is produced in Europe is of the best quality that the author has ever seen. In its production blind heads and risers are employed; Washburn cores are used with knock-off risers; good sand traps are incorporated; valves are fed at the parting line, and placed at the flange adjacent to the core print. No attempt is made to feed through the outer rim of the flange, and great attention is given to melting practice and skimming. Deoxidation of the metal is considered to be of prime importance. One of the reasons for the absence of oxides in the castings is believed to be the care which is taken to avoid causing turbulence in the metal.

Shakeout Equipment

There is a noticeable lack of European shakeout equipment, and many man hours per ton are wasted at the shakeout. The author believes that most European foundries could benefit from good shakeout equipment. Many North American foundries are similarly lacking in shakeout equipment. There is also a scarcity of portable pneumatic vibrators (of the type which are attached to castings to break loose the adhering sand) in Europe.

Fettling

The man hours per ton required to fettle castings in European foundries have been greatly decreased by modern methods. A simple bookkeeping scheme which is in use on the Continent could be used to advantage by foundries in the USA. This system involves separating the fettling-shop costs from the actual foundry costs. The fettling shop is treated as a separate company, often located away from the foundry, and may even be known by another name. Where this arrangement is in operation, the fettling department also incorporates the inspection and despatch sections. The separate fettling company purchases the castings from the foundry, pays the foundry a small operational profit, and sells finished castings to the customer. This company-within-a-company system is highly competitive, and many European foundries find this competitive attitude assures better service to the customer.

Painting of Castings

The European foundryman does not paint his castings so thickly as the American does. Perhaps US castings are painted to cover the generally rougher surface than that of European castings, or perhaps the European takes greater care in the fettling shop than the American.

Non-destructive Testing

The United States appears to be ahead of Europe in non-destructive testing. However, the European is trying to catch up by employing more magnetic surface-testing methods, which are very useful for

inspecting castings in parts where the working stress is high.

X-Ray and Gamma-ray

X-ray and gamma-ray equipment is now being used more widely in Europe than in the past. Some Europeans feel, however, that the cost added to the casting is excessive, but where these devices *are* used, they are handled very efficiently.

Cobalt 60

Cobalt 60 is reasonably priced in Europe, and is within the reach of most foundries. It is claimed to have the advantage of portability, simplicity, flexibility, and low cost. However, a very high standard of radiograph interpretation is required when using this source. Radium salts are not used extensively, due to their high price.

Machine-shops *versus* Foundries

The machine-shops of Europe are excellent. Many foundries throughout Europe are beginning to market partially-machined castings ("rough machined"), and it is the author's opinion that more North American foundries could adopt this selling policy with advantage, since it would save many differences of opinion between the foundry and the customer as to surface finish. Most European foundries find their customers quite receptive to this policy. Automatic jig borers are installed in many European machine-shops, and the drilling of intricate holes in metal has become a real science in some cases. Electronic controls master-mind the machines, and castings are drilled and machined with great efficiency.

Apprentice Training

All through Europe apprentices are learning their trade and developing into well-qualified journeymen. Craftsmen teach the apprentices the art of making a mould by certain proven and time-tested methods, but no thought is generally given to whether comparison with other countries might change these methods. There is far more vocational and apprenticeship training in Europe than in North America, and, since there is more loose-pattern work in Europe, craftsmanship is still the most important part of moulding technique.

Politics and Trade Unions

It must be borne in mind that two major wars have swept across Europe within a period of twenty-five years, and have affected industrial organization immensely. The various governments, and trade associations in Europe influence foundry productivity a great deal. Incentives are often ignored by the trade unions for one reason or another, which adversely affects sales However, there seems to be an abundance of manpower available.

Competition between countries is just beginning in Europe. Certain countries have advanced at such a rapid rate that their influence is felt all over the Continent. Because of this competitive influence, some foundries may soon be forced to change established methods, since tariff barriers are being gradually eliminated. There are very many small foundries in existence at the moment, and the competition is expected to become very keen in the near future.

[*Courtesy: Husqvarná Vapenfabriks.*

Hoppers in a Swedish foundry, showing rubber windows cut into them so that sand can be removed by gently tapping.

Acknowledgments

The author acknowledges his indebtedness to the 84 European foundries that so kindly opened their works to him on the most friendly terms. The courtesies and considerations accorded to him will not be forgotten. Every American foundryman visiting Europe can learn much of value to him.

ADA Annual General Meeting

The annual general meeting of the Aluminium Development Association was held on April 17, at 33, Grosvenor Street, London, W.1, when the annual report was presented by the retiring president, Mr. S. E. Clotworthy. In surveying the year's work, the president expressed satisfaction with the extent to which progress had been maintained and in several directions accelerated, and this was endorsed by the meeting.

Mr. Rudolf Hahn, chairman and managing director of B.K.L. Alloys, Limited, was elected president of the Association for the ensuing period of 1959/60. Mr. Hahn represents, on the ADA Council, the Association of Light Alloy Refiners and Smelters, Limited. Mr. S. E. Clotworthy, managing director, Northern Aluminium Company, Limited, was elected vice-president of the Association.

Closure of Kettering's Blast Furnaces

The end of a chapter in the history of heavy industry in Kettering was marked by a final cast at the Kettering Iron and Coal Company, Limited, when the company's blast furnaces closed down. Giving reasons for the closure, Mr. G. H. Johnson, managing director, said in a statement earlier this year, that the Iron and Steel Board had called attention to Britain's excessive capacity for producing pig-iron in the Midlands in relation to a declining demand, much of which is permanent. Alternative competing materials had replaced iron castings in many fields. Some of the excess capacity for producing foundry pig-iron had already been eliminated and more is likely to follow. Mr. Johnson continued " the concentration of production elsewhere which has been decided upon has been rendered necessary to improve the loading of blast furnaces at composite plants working below capacity. Ultimately this should be of benefit to the consumers."

Of the labour force of 240, about 100 men are being retained in other projects of the company, and employment has been found for almost all the others within the Stewarts and Lloyds group.

The company was incorporated in 1876, and for more than 80 years the works have operated as an isolated blast-furnace plant supplying mainly light foundries, themselves widely dispersed throughout Great Britain. At various periods, notably in times of national emergency, basic pig-iron for steelmaking has also been produced to make up local shortages at the steelmaking centres which, under to-day's conditions of manufacture, are not likely to recur.

The company is to carry on the quarrying of ironstone until the properties under its control are exhausted. The roadstone works, which are busy and which are based on blast-furnace slag, will also continue in operation. In 1957, the New Cransley Iron and Steel Company, Limited, closed and Mr. Johnson said that the latest closure brought much of the town's heavy industry to an end.

Interesting Walsall Development

Headed by Mr. H. G. Hall, the town of Walsall has organized a Foundry Trade Joint Recruitment and Training Committee which, unlike most activities of this kind, is all embracing and includes employers, educational authorities, foundry and patternmaking trade unions. It has undertaken four main responsibilities: (1) To actively assist in recruitment of young persons; (2) to encourage systematic training of young employees; (3) to maintain a live interest in and reward the worker for diligence and progress; and (4) to inspire and create additional incentive in the foundry industry.

So far the Committee has issued its annual report and held a dinner at which some apprentices were present, and has awarded four prizes to apprentices, one for each year in the four-year apprenticeship period. This activity will be followed with interest by other localities.

W. A. HISCOX, LIMITED, quarry-plant manufacturers, of Stuart Street, Derby, have acquired the whole of the issued capital of D. Chattaway & Son, Limited, constructional engineers, of Stores Road, Derby. The firm will be kept as a separate entity. Hiscox, Limited, was founded in 1914, by the late Mr. W. A. Hiscox. The present managing director is Mr. E. W. Hiscox.

Founders' Company visits Sheffield

The Worshipful Company of Founders of the City of London paid a three-day visit to Sheffield on April 29 to May 1. It is thought to have been the first special visit of a London Livery Company to the city. On April 29 they visited the offices and showrooms of Thos. W. Ward, Limited, Albion Works, and were afterwards entertained to dinner by the company at the Cutlers' Hall, where they were welcomed by the Master Cutler, Mr. J. Hugh Neill. Other speakers included Mr. Arnold Carr, deputy chairman of Thos. W. Ward; Mr. G. W. Ilsley, Master of the Founders' Company, and Mr. J. C. Thomson, Under-Warden of the Founders' Company.

On April 30, a visit was made to the English Steel Corporation, Limited, where Dr. C. J. Dadswell, managing director, said they were fairly busy with railway specialities, both for home and abroad, and the order books of the heavy-engineering industry meant that the heavy steel foundry would be well occupied for several years to come.

The visitors saw the melting shop where ingots of 300 tons weight can be produced, and at the 7,000-ton forge they saw a boiler drum being shaped for the Thorpe Marsh power station, Doncaster, the largest in Britain.

The British Steel Castings Research Association's laboratories and Hadfields, Limited, were visited on May 1. At Hadfields they were accompanied by Lord Dudley Gordon, chairman, Mr. Harold Humphries, managing director, and a number of other directors. Their visit coincided with a furnace tapping and the start of forging of a 35-ton ingot in the 2,700-ton press.

The party was entertained to luncheon by the firm afterwards.

Machine-tool Industry in January

January's statistics for the machine-tool industry fail to reflect the guarded optimism expressed by individual firms. Both home and export deliveries were down and there was a further contraction in the order-book. Home deliveries dropped by £300,000 to £4,800,000 and exports by £200,000 to £1,400,000. Orders were down by similar amounts, making the total for the month £4,400,000.

The complete order-book at the end of January was down by £1,900,000 to £53,800,000, which means that with total deliveries of about £6,000,000 a month there was nine months' work on the books. This is much the same position as the previous January, a fact which is explained by the steady cutting back of production within the industry to match the declining orders.

Figures for February and, probably, for March are expected to show some improvement. The main interest, however, will centre on results for April. On the home side the industry expects the tax reduction and investment allowances in the Budget to have a cumulative effect on orders, but possibly not until the autumn. It is thought that manufacturing firms with considerable excess capacity may not be inclined to order new plant, though it is hoped that they will replace some of their obsolescent equipment.

UNION CARBIDE, LIMITED, announce that existing facilities for the production of polyethylene at Grangemouth, Scotland, are to be augmented by another unit scheduled to produce 13,400 tons annually. It is anticipated that the new unit will be in production by late 1960. Bakelite, Limited, an affiliate of Union Carbide, will distribute the output of the plant.

Association of Bronze and Brass Founders

Report of Activities during 1958/59

The annual general meeting of the Association of Bronze and Brass Founders was held at the Waldorf Hotel, London, on April 29, when the reports of the president, Mr. P. B. Higgins, and of the Chairman of the Technical Committee were presented.

PRESIDENT'S REPORT

In his report the president said that Council meetings had been held quarterly during the last year and, in addition, members of Council had attended meetings of sub-committees and various meetings throughout the country. An ABBF representative was one of the four UK delegates on the European Committee of Foundry Associations, which meets twice a year.

Council Membership

During the year the Association had regretfully accepted the resignation of Mr. A. N. Wormleighton, consequent on his resignation as managing director of the Phosphor Bronze Company, Limited. The president said that there had been no greater worker for the Association than Mr. Wormleighton and it was a great disappointment to many members that he was unable to continue the good work he had done, not only with the costing committee, but with the National Foundry Craft Training Centre.

Membership

Five resignations had been accepted and four new members approved, so the Association was holding its own. The four new members were William Eagles, Limited, Manchester; Samuel Langton & Sons, Limited, Stockport; Mears & Stainbank, London; and Weir Foundries, Limited, Glasgow. Firms resigning from membership were C. Binks, Limited, Rainham; William Broady & Son, Limited, Hull; Coxhead's Stratford Foundry, Limited, London; C. & A. Stewart, Limited, Glasgow; and Willey & Company, Limited, Exeter. It was very disappointing that there should be these resignations but in one or two cases the firms were going out of the foundry industry.

Area Meetings

Area meetings had been held regularly and had been very well attended. In London there had been five meetings, in the Midlands two, in Lancashire and Cheshire two, in Scotland three and in Yorkshire three. In Yorkshire member-firms, after a meeting, had thrown open their works for visitors, a gesture which had been very much appreciated.

Apprentices' Recruitment and Training

The results of the apprentice competition held in this country last year had shown up only too well the lack of apprentice training and training on the right lines and the ABBF Council had decided to form a sub-committee to report on the whole question; in the meantime the London area had held a local competition. The European Foundry Apprentices' Competition was the main cause of bringing to light the deficiencies in the UK educational system and steps were being taken in conjunction with the Council of Iron Foundry Associations and the British Steel Founders' Association, to review the whole question of the National Foundrycraft Training Centre to ensure a steady flow of skilled men. The National Foundry College was developing and post-graduate courses had been instituted at the Birmingham University for graduates.

Reverting to the cause of the inquiry into apprentice training and education in this country, the president said there was no doubt that its deficiencies had been shown up and brought to light very strongly by the European Apprentices' Competition. In respect of the competition he referred specifically to the excellent work which Mr. Charsley had done on members' behalf, representing the Association as a judge in the competition in Paris. The Association was delighted that other associations thought sufficiently highly of him to appoint him to this task. It was a very onerous task, but more particularly he referred to Mr. Charsley's work in helping to prepare the boys who went to represent this country.

He then reminded members that the European Foundry Apprentices' Competition would be held in the United Kingdom in 1960, and that it would have to be financed by the industry. The total cost would be somewhere in the region of £4,000: the CFA were prepared to spend £2,000 and the BSFA £1,000, the Association was required to find £1,000 which, he said, was not such a great sum if shared equally amongst all companies. In the ABBF it meant an appeal for £10 per member.

"Costing a Casting"

As a result of three years' hard work by the cost committee, the booklet "Costing a Casting" had been published, and had created a great deal of thought not only amongst members. At numerous area meetings a paper on the publication had been given very ably by Mr. W. H. Davies and the interest and discussion which had been aroused was, in itself, a tribute to the work of the cost committee. Further meetings were proposed to give practical advice on installation. Costing was now receiving European investigation and the Association was pleased that Mr. Sheckell had agreed to be nominated to represent the United Kingdom on the cost committee which was at present discussing this subject within the framework of the European Committee of Foundry Associations.

Safety, Health and Welfare Conditions in Non-ferrous Foundries

Mr. Ayres, Mr. Hobkirk and the president had represented members on the Chief Inspector's Advisory Committee and the second report cover-

ABBF—Report on Year's Activity

ing the medical aspects of health and welfare in non-ferrous foundries had been prepared. The work that had been done by the sub-committee in particular, and the work that was being done in this Committee, was to be commended to members; it would show the benefits which a large number of members in the Association had contributed, from the practical side, to a work which was mainly a medical publication.

Foundry Exhibition

The Association has been offered free stand accommodation at the Foundry Trades and Equipment Supplies Exhibition to be opened in Birmingham on May 21. To make the stand worthwhile, the ABBF had joined with the British Steel Founders' Association and the committee, under the chairmanship of Mr. Ayres, had done very good preparatory work. It was intended to show on the stand some of the products of interest made in bronze foundries, but no individual advertising would be allowed. It was intended that the ABBF exhibit would be for the benefit of the Association and it was hoped that more bronze founders would join the Association as a result.

Directory of Members

A "Directory of Members" had been produced which, while of interest to members, would also be of interest as a guide to buyers. The Association would like members' guidance, through area meetings, as to how it should be circulated.

*BS*1400 *Revision*

The president said he was very surprised at the statement issued by the Ingot Makers and he felt that he should remind everybody that the reason for improving the physical properties of copper-alloy ingots and castings was to tell the designers and the world in general that British specifications were as good, if not better, than those of foreign competitors. Most of the larger ingot makers were quality-conscious and found no difficulty in meeting the revised requirements. The Association had supported the revision of BS.1400 in the interests of the bronze trade as a whole and he felt that the ingot makers in their own interests should do the same.

European Committee of Foundry Associations

The Light Metal Founders' Association had finally come into the European Committee to strengthen the non-ferrous delegation from the United Kingdom. The ABBF was gradually sorting out the sub-committees which are of interest to the United Kingdom and the Association is represented on the following committees:—No. 1: Training; No. 6: Standardization of Costing; No. 8: Standardization of Conditions of Sale; No. 9: Committee of Safety, Health and Welfare; No. 11: Committee of Raw Materials and Energy, and No. 12: European Institution.

In this way the Association was sharing the work of this European Committee and obtaining for the benefit of members information which was becoming more important now that the Common Market had tightened its net against the rest of Europe. The position was very difficult at the present time, but the interest of members was being closely watched.

Export of Scrap

When the Government was inquiring into the de-control of the export of scrap, with the liaison and concurrence of the other associations interested, the Association was successful in its representations to the Board of Trade, who had decided that the export control on non-ferrous scrap should not be lifted for the present time. It was worth emphasizing that it was high time the Government realized that all the foundry industry had to export was the products of its brains and labour, and for these cheap raw materials and cheap fuel and power were required. The industry no longer got cheap fuel and power due to nationalization, but at least it had cheap raw material, and any relaxation of the export control on scrap material would inevitably lead to providing competitors abroad with cheap raw materials which they would use against UK founders and against the export trade of this country.

Intergovernmental Conference on Non-ferrous Metals

In conjunction with the liaison committee, the ABBF was represented at the Intergovernmental Conference on Non-ferrous Metals where it was suggested that the control of the price of metals might be the subject for Governmental negotiation. The trade as a whole thought that this was not in its best interests and approved the ABBF representative opposing the controlling of the prices of the industry's raw materials. The conference was of an exploratory nature on an international basis.

Factory Bill

Alterations to the Factory Act were set out in the Factory Bill and information on this subject had been disseminated to all members. There had been very little complaint or reaction to the proposed Government proposals so the sub-committee had not made any representations so far.

Foundry Liaison Committee

Lastly, the president referred to the liaison committee which, soon after he was elected president, he tried to promote. He was pleased to report that this liaison was working. A great deal of credit was due to the efforts of the leaders of the Council of Ironfoundry Associations, the British Steel Founders' Association and the Light Metal Founders' Association. A meeting-ground had been formed where matters affecting the foundry trade as a whole could be freely discussed and questions considered and information given.

This liaison of the foundry industry as a whole was of inestimable value, not only to members, but to all members of the foundry trade. A very simple example of its value was the way in which the problem on CO_2 Patents was speedily dealt with. It would be found that the largest producers would find it difficult to argue against the foundry trade as a whole.

The chairman of the Technical Committee, Mr. R. Lancaster, presenting his report said: In addition to the four regular meetings, special meetings of the technical committee had been held to discuss the draft of the Companion Volume and No. BS.1400 draft issued for comment to industry. In connection with technical committee meetings it had been usual to hold a meeting of the Companion Volume sub-committee and the research and technical advisory liaison committee.

TECHNICAL COMMITTEE REPORT

BS.1400 Revision

The revision of BS.1400 had continued to be a major preoccupation, and the work after many years of deliberations, had culminated in the issue by the British Standards Institution of a draft to industry for comment. The Association was aware that the proposals still contained contentious matter, but it was of the opinion that the stage had been reached when the opinions of industry as a whole rather than members of the BSI committee should be obtained without further delay.

The technical committee had tried to keep members informed of the progress of the revision and the proposals being considered, but the revision had spread over such a long period that the reasons for some of the changes may have become obscured; a review had therefore been drawn up for the information of members.

Although the ABBF only represented the foundry industry on this revision, it supported in general the moves to define the compositions more clearly and to put in mechanical properties which were more realistic than the figures called for at present. The Association did not like the inclusion of two grades of gunmetal, but in accordance with an agreement with the Ingot Manufacturers' Association, it had not so far opposed this.

The most difficult question had been that of aluminium-bronze AB2 on which very strong views were held by both those who supported and those who opposed increased properties for the sand-cast alloy. The technical committee's proposal, which was a compromise reached only with great difficulty, was that the properties should be, tensile strength 41 tons per sq. in., elongation 15 per cent., 0.1 per cent. permanent set stress 16 tons. Comments from members were much appreciated and had received very careful consideration.

International Standards Organization

At the International Standards Organization's conference held at Harrogate in June last, the copper-alloy casting sub-committee agreed nominal compositions, tolerances for main constituents and certain impurities for the groups of alloys previously adopted; mechanical properties and further limits for impurities are the next points to be discussed. France is particularly interested in the tolerances for impurities and is collecting a great deal of information on the subject and the Association hopes to obtain useful information on the subject from work being carried out by the BNFRA. The ABBF representatives were kept informed about these matters and given the opportunity to comment on them. It was a matter for great regret that America was still not taking part in this work.

Companion Volume to BS.1400

A great deal of work had gone into the preparation of the companion volume to give information on the properties and uses of the alloys in BS.1400, as revised. It could not, of course, be completed until the Standard itself was finalized. A wide distribution of the volume among customers of member-firms would lead to a more enlightened use of the alloys.

Code of Procedure for Inspection

Meetings with the Ministry of Supply Inspectorate, under the guidance of Admiral Kelsey, had shown the great success of this code. A reprint is to be made shortly, as stocks are exhausted, and only minor amendments will be necessary.

Specification for Investment Castings

The M.O.S. specification for steel investment castings for use in land or air Service requirements had recently been extended to cover non-ferrous investment castings. The ABBF had suggested a number of amendments which had been adopted.

Decimalization

The Association had been represented on the Institute of British Foundrymen committee dealing with the British Association questionnaire on the decimalization of measures, weights and coinage. It was felt that the extension of the metric system to this country was an inevitable, and in many ways desirable, development and the ABBF had given it support. It would necessarily take a number of years to put fully into effect.

BSI Committees

The ABBF is represented on many BSI Committees. Apart from that dealing with BS.1400, those concerned with ships' side scuttles and frames and sampling and analysis of copper-alloys are at present active.

Education

Proposals for additional courses at various levels had come before the Association for comment. As the importance of properly qualified and trained men in the foundry was so important, the ABBF had given these proposals its support.

British Non-Ferrous Metals Research Association

An ABBF sub-committee of the Research and Technical Advisory Group which maintains liaison with the BNFMRA had held regular quarterly meetings. The work of the committee was most valuable and members of the research group would appreciate that worthwhile results are being obtained. Those outside the group would find that membership of the group would be to their great advantage.

Membership of Committee

There had inevitably been some changes in the Technical Committee during the year, and resignations had been received from Mr. E. Ayres, Millspaugh, Limited; Mr. J. A. Duncan, Westinghouse Brake & Signal Company, Limited, and Mr. G. A. Hannaford, Phosphor Bronze Company,

ABBF—Report on Year's Activity

Limited, he would like to place on record his appreciation of the good work which they had done. Their places had been taken by Mr. C. McNair, Mr. A. L. Morgan and Mr. G. Swinyard of the same companies. It was expected they would render the same high services as those they replaced.

Finally, the chairman expressed his thanks to the secretaries, and in particular Mr. Rogers, for excellent service rendered to the Technical Committee and to himself as chairman. He also thanked the members of the Committee for their services on all occasions.

ANNUAL MEETING

The sixteenth annual meeting was held at the Waldorf Hotel on April 29, Mr. P. B. Higgins presiding. The minutes of the last meeting and the accounts having been approved, Mr. A. J. N. Brown, of Steven and Struthers, Limited, of Glasgow, was elected president, and Mr. W. R. Buxton of the Eyre Smelting Company, Limited, London, the vice-president. The election of the Council involved the following changes:—Mr. A. N. Worm leighton and Mr. W. Brown have resigned; Mr. Marsland will in future represent Charles Carr, Limited, and Mr. James J. Mundell, Knowsley Cast Metal Company, Limited, and Mr. E. Walker, Phosphor Bronze Company, Limited, are newcomers.

Membership of the technical, publicity and cost committees was unchanged, but a new committee for recruitment and training was set up, with Mr. E. Ayres, Mr. G. H. Charsley and Mr. A. R. French as members. Mr. Rex Buxton was reappointed Editor of the *Bulletin;* and Mr. P. B. Higgins is to continue to be representative on the European Committee of Foundry Technical Associations. The auditors and the secretaries—Heathcote and Coleman—were re-elected.

Conference on X-ray Analytical Methods: Research and Control Instruments, Limited, in conjunction with the Department of Chemistry at the Imperial College of Science and Technology, are holding a conference on X-ray diffraction and spectography at the College from July 6 to 10. At the conference modern techniques and instrumentation for diffractometry and fluorescent analysis will be discussed and an extensive range of equipment will be available for demonstrating the principles of these methods. Time will be made available for the consideration and study of samples submitted by members. Sample preparation and presentation together with the use made of electronic analytical information will be discussed in relation to the requirements of industry. Full information concerning the conference together with details of the registration fees may be obtained from the conference secretary at Research and Control Instruments, Limited, Instrument House, 207, Kings Cross Road, London, W.C.1, to whom all enquiries and applications should be addressed.

Correspondence

B.S. 1400, SPECIFICATION FOR COPPER-ALLOY INGOTS AND CASTINGS

To the Editor of the FOUNDRY TRADE JOURNAL.

SIR,—We have read the statement by the Association of Bronze & Brass Founders on the proposed revision of B.S. 1400 in your issue of April 30. It is not desired to enter into lengthy correspondence in the Press on the subject, but I would point out that:

(*a*) Members of this Association represent at least 82 per cent. of the bronze and brass ingot and billet production in the United Kingdom, not 10 per cent. as asserted by the ABBF. The views expressed have the general approval of our members which cannot be dismissed "as minority views."

(*b*) In dealings with the ABBF, this Association has for several years emphasized that the tightening of specifications must increase costs. If your readers refer to our statement, which you printed in your issue of March 19, they will see that the cost aspect is repeatedly stressed.—Yours, etc.,

JAMES H. BARWELL,
President.

British Bronze & Brass Ingot
Manufacturers Association.
May 2, 1959.

AFS Apprentice Contests

Craftsmen are made, not necessarily born to the art, and the American Foundrymen's Society, encourages good craftsmanship by annually sponsoring apprentice contests in five divisions of foundrywork: grey-iron, steel and non-ferrous moulding, and wooden and metal patternmaking.

That the competition has a far-reaching appeal throughout the metal castings industry, is evidenced by nearly 500 entries in the 1959 contests. This year set the record for the greatest number of participating companies, a total of 189. Eligibility for entry is restricted to trainees with not more than five years patternmaking experience, nor more than four years moulding experience. Winning entries were displayed at the AFS Engineered Castings Show and the 63rd AFS Castings Congress, held at the Sherman Hotel, Chicago, from April 13 to 17.

Employment of Boys in the Steel Industry

New regulations made by the Minister of Labour and National Service which affect the employment of young persons between the ages of 16 and 18 in the iron and steel industry (Employment of Young Persons (Iron and Steel Industry) Regulations, 1959) were laid before Parliament last week. They came into operation on May 3.

The regulations permit male young persons to be employed between midnight and 6 a.m., but not for more than 12 in any period of 28 consecutive days, nor for more than 176 hours during that period.

INDEX OF INDUSTRIAL PRODUCTION (1954=100) is estimated provisionally at 110 for February and is expected to be 107-108 for March. Easter affected this year's figures. There is little indication of any significant change over the past five months, production having remained fairly constant at 2 per cent. above the low point reached in the middle of last year.

Outstanding Steel Casting

The principal exhibit on the David Brown Industries, Limited, stand at the recent Engineering, Marine, Welding and Nuclear Energy Exhibition (April 16 to 30 at Olympia, London, was one of the 24-in. oil-pipline valves shown in the illustration.

Weighing approximately 6 tons and measuring over 8 ft. high by 3 ft. wide, the valves are cast in carbon steel, the bodies being moulded in three sections. Submerged arc welding is used to join the main body castings, which are required to withstand pressures up to 2,400 lb. per sq. in.

American Letter

Nickel Alloys at High Temperatures*

The effects of solid solution alloying, and of a second phase, on the creep-rupture properties and deformation mechanisms of pure nickel were studied by means of creep-rupture tests on binary alloys of nickel-chromium (19.59-29.3-35.8-40.12-44.95 wt. per cent. Cr); nickel-molybdenum (10.2-15.0-20.3-23.2-25.5-27.3 wt. per cent. Mo), and nickel-tungsten (20-28-30.5-35.1-39.9 wt. per cent. W) at 649 and 816 deg. C. The mechanical properties of the solid solution alloys were determined at room temperature, and at 649 and 816 deg. C. At 649 and 816 deg. C. the stress for rupture in 1- and 100-hr. increases in the order of chromium, molybdenum, and tungsten in the same manner as the flow stress at room temperature. The maximum strength of the solid solution alloys is obtained for the alloys which were saturated with the added element, in which case the strength increases in the order of tungsten, molybdenum, chromium, *i.e.* the higher the solute content at the limit of solubility, the greater the strength of the alloy. All fractures were intercrystalline in the 100-hr. tests. The rich alloys invariably exhibited low ductility, whereas the lean solid solution alloys showed a ductility which decreased in the order chromium, molybdenum, and tungsten.

* Synopsis of a paper, by Regis Pelloux and N. J. Grant (Massachusetts Institute of Technology), presented at the AIME Convention in San Francisco in February.

Employment Situation

Early this year some 6½ per cent. of the American labour force of 70 million was unemployed. This percentage has recently fallen to 6 per cent., as the following figures indicate:—

Employed — 63,828,000
Unemployed — 4,362,000

The percentage of unemployed is expected to further decrease to 5 per cent. before the end of this year, which will reduce the number unemployed to 3½ million or less. A contributory factor to the present level of unemployment is said to be the reluctance of employers to acquire additional personnel; they prefer rather to increase the working hours of established employees. This is because of the obligations, in the form of pension schemes and other benefits, which result from such an increase in staff.

British Industrialists to visit Northern Ireland

Visiting Northern Ireland on May 11 and 12 to study the progress of industrial development and the factory building and other services provided by the Northern Ireland Government is a small group of British industrial leaders from the Federation of British Industries and the British Employers' Confederation.

The party will include Lord Chandos, chairman of the Northern Ireland Development Council and chairman of Associated Electrical Industries, Limited, and its principal subsidiaries, Mr. W. H. McFadzean, president of the FBI and chairman and managing director of British Insulated Callender's Cables, Limited; Sir William Garrett, president of the British Employers' Confederation and a director of Monsanto Chemicals, Limited, and Metal Industries, Limited; Lord McCorquodale of Newton, vice-president, and Mr. George Pollock, director of the BEC; Sir Norman Kipping, director-general of the FBI, and Mr. P. A. Macrory, who is chairman of the Federation's location of industry committee and a member of the Development Council.

Foundry and Patternshop Supplies. Two catalogues have been received from A. Lakin & Son, Limited, Station Works, Beauchief, Sheffield, 8. The sections covering such items as chaplets are most useful as small diagrams are used to illustrate each unit. It is easier when ordering to refer to these than to explain the items required in writing, and the reviewer suggests that a number or a code word should be attached to each design to facilitate business transactions. The two catalogues, both loose-leaf, are uniform in format, but of differing colour. Between them they consist of over 40 pages covering an extremely wide range of tools and general supplies. Buyers will find these catalogues quite interesting as for a few of the items listed the source of supply is not always easy to find.

British and World Shipbuilding

Lloyd's Register Returns for March Quarter

Steamships and motorships under construction in Great Britain and Northern Ireland at the end of March totalled 312 ships of 2,248, 852 tons gross, an increase of 14,694 tons compared with the previous quarter, states Lloyd's Register of shipbuilding returns relating to merchant ships of 100 tons gross and upwards. Some 59 ships of 319,543 tons were commenced, 58 of 270,173 tons launched, and 57 of 312,530 tons completed. The vessels under construction included 61 steamships of 1,112,063 tons and 251 motorships of 1,136,789 tons.

In other British Commonwealth countries there were under construction 10 steamships of 114,720 tons and 50 motorships of 126,555 tons. Oil tankers building in Great Britain and Northern Ireland totalled 74 ships of 1,091,791 tons, an increase of 27,596 tons compared with a decrease of 86,376 tons in the previous quarter, and representing 48.7 per cent of the total tonnage under construction in this country.

Vessels building in the world, excluding China and Russia, numbered 1,511 of 10,001,761 tons compared with 1,442 of 10,002,846 tons in the previous quarter. The total included 261 steamers of 4,765,357 tons and 1,250 motorships of 5,236,404 tons. Construction in hand in the principal districts of Great Britain and Northern Ireland is indicated in Table 1.

TABLE 1.—*Shipbuilding Construction in Hand in Principal Districts of Great Britain and Northern Ireland.*

District.	March 31, 1959.		December 31, 1958.		March 31, 1958.	
	No.	Gross tonnage.	No.	Gross tonnage.	No.	Gross tonnage.
Aberdeen ..	17	30,114	14	21,490	16	18,882
Barrow ..	2	67,500	2	67,500	2	67,000
Belfast	17	308,230	16	296,780	17	298,490
Bristol	2	4,850	2	4,850	4	6,430
Clyde:						
Glasgow ..	60	498,929	65	517,659	69	455,263
Greenock ..	24	164,296	29	193,910	31	178,110
Dundee.. ..	5	43,100	5	43,100	7	48,550
Hartlepool ..	4	28,200	5	36,240	9	71,080
Hull	38	15,176	39	16,642	33	17,153
Leith	10	44,319	10	49,000	13	69,590
Liverpool ..	12	111,678	11	112,053	15	145,487
Middlesbrough..	13	197,986	15	194,164	16	206,843
Newcastle-on-Tyne ..	40	457,464	36	423,032	41	421,700
Southampton ..	9	8,717	8	8,178	10	6,921
Sunderland ..	25	245,244	24	225,050	26	217,862

The sizes of steamships and motorships (in parentheses) under construction in Great Britain and Northern Ireland included the following:—100 to 500 tons, 3 steam (90 motor); 500 to 1,000 tons, 3 steam (17); 1,000 to 2,000 tons, steam, nil (19); 2,000 to 4,000 tons, 2 steam (13); 4,000 to 6,000 tons, 2 steam (15); 6,000 to 8,000 tons, 2 steam (17); 8,000 to 10,000 tons, 3 steam (35); 10,000 to 15,000 tons, 17 steam (38); 15,000 to 20,000 tons, nil steam (nil); 20,000 to 25,000 tons, 14 steam (4); 25,000 to 30,000 tons, 8 steam (nil); 30,000 to 40,000 tons, 7 steam (nil); 40,000 tons and above, 3 steam (nil).

Of the steam and motor merchant ships under construction throughout the world at the end of March, 5,696,630 tons (57 per cent.) are under the inspection of Lloyd's Register. Of this total, 2,201,862 tons, representing 97.9 per cent. of the tonnage being built there, are under construction in Great Britain and Northern Ireland; while of the tonnage being built abroad, 3,494,768 tons (45.1 per cent.) are to be classed with Lloyd's Register.

European Community Prize

The High Authority of the European Coal and Steel Community has decided to grant in 1959 a European Community Prize to be awarded for a university thesis already submitted at one of the universities of the countries listed below. The value of the prize is bfrs. 100.000 (approx. £725).

Theses presented by candidates must make an original contribution to the study of the problems of all kinds (history, geography, sociology, social psychology, political science, law, economics) related to the experience of the ECSC and, more generally, to the objectives and first results of the policy of integration pursued by the six member states of the European Communities (ECSC, Common Market and Euratom).

Conditions of Eligibility

It is stipulated that (*a*) candidates must be nationals of one of the member states of the European Community or of European states which have signed an agreement of association or consultation with the ECSC (United Kingdom, Austria and Switzerland). An exception will be made, however, for refugees from European countries, provided they are legally resident in the territory of a member state. (*b*) Candidates will be disqualified if they make any approach, whether direct or indirect, tending to influence the decision of the selection committee. (*c*) Employees of the European institutions, their wives or husbands and children, who customarily live with them, may not participate.

The prize would be awarded by an international jury which will meet at the end of June, 1959, in Strasbourg, under the chairmanship of His Excellency Ambassador van Kleffens. The jury may call in the advice of any expert whom it may choose. The prize-winner will be under an obligation to assure the preproduction of a minimum of 300 copies of his work, out of the value of the prize, thus permitting its distribution to European universities and specialized institutes. The theses must be written in one of the official languages of the ECSC (Dutch, French, German, Italian) or in English. Three copies must be dispatched before May 15 to the following address: Prix de la Communaute Europeenne (Service d'Information), Place de Metz, Luxembourg.

Normal Working resumed at Stanton Spun-pipe Plants

Continuing improved demand for spun-iron pipes has enabled all three spun-pipe plants at the Stanton Works of the Stanton Ironworks Company, Limited, near Nottingham, to revert to normal working. The Dale spun-pipe plant, which has been operation a nine-shift week since April 20, and before that an eight-shift week from January 26, began a 10-shift system last Friday.

A five-day working week has been introduced at the Nutbrook spun-pipe plant also from May 1. This plant has operated on a four-day working week since January 26. About 600 men are affected at the two plants. The 18-ft. spun-pipe plant reverted to a five-day week the Friday before last.

In order to halt the build up of stocks and to bring despatches and production more into balance, the company introduced, as a temporary measure, four-day week working at its Erewash Foundry on April 27. Some 300 men are affected. The main products of this mechanized foundry are pipe specials, tunnel segments, and joint components.

Notes from the Branches

Lancashire

The 1958/59 session of the Lancashire branch of the Institute of British Foundrymen closed with the annual general meeting, held at the Midland Hotel, Manchester, on April 25. Following the election of officers (reported in the JOURNAL last week, p. 511) Mr. H. Booth, chairman, announced that, as a result of members' voting, it had been decided to hold next session's meetings on Monday evenings, exceptions being the opening and closing meetings, which would be on Saturdays. The results of John Wilkinson Medal Competition were then announced by Mr. C. M. G. Wallwork, organizer of the competition. The first, second and third prizewinners were Mr. A. Whitfield (Distington Engineering Company, Limited); Mr. F. R. Howarth (Leyland Motors, Limited) and Mr. D. W. Wood (Leyland Motors) respectively. Mr. Booth, who had the pleasant duty of congratulating the prize-winners and presenting them with their awards, also commended Mr. Michael Tobin, an apprentice, who had won a plaque in the European Foundry Apprentices' Competition. He then called upon Mr. Whitfield to deliver his winning paper entitled "Making a Vessel for the Chemical Industry."

Mr. Harold Haynes, the lecturer for that evening, then took over from Mr. Whitfield and presented his paper entitled "Looking after the Apprentices." In this he gave details of the methods of training he had employed, and stressed the importance of the "personal touch" between manager and apprentice. He also placed emphasis on the value of encouragement and suggestion as opposed to compulsion to achieve desired results. Slides were used to illustrate jobs made by apprentices under his control.

In the discussion which followed, Mr. F. Harper asked if Mr. Haynes thought an apprentice, in competitions, would rather make a casting than write a paper, to which Mr. Haynes replied that a boy could make a casting, possibly after two weeks in a foundry, but to design a paper, and present it, was, in his opinion, a more worthwhile achievement. Whereupon, Mr. Harper expressed surprise and said he thought that writing a paper might scare a boy. But Mr. Haynes said that the "John Wilkinson" Competition provided the answer to this—it was well ahead of any other competition which existed in the Institute.

The meeting concluded with a vote of thanks being proposed to Mr. Haynes by Mr. Cook, Jnr., and seconded by Mr. Walker, the proposal being carried with acclamation.

Natal Section

The first two meetings this year of the provisional Natal section of the Institute were well attended, the venue on each occasion being the Shell Cinema, Esplanade, Durban.

The first lecture was given on January 22 by Mr. J. Robertson, chairman of the committee, who chose as his subject "What the Moulder expects from the Patternmaker." In the course of his extempore address, Mr. Robertson stressed the need for close co-operation between the foundry, coreshop and patternshop at all times. In his opinion, the moulder in most cases, could only make his requests when the pattern was given to him and this was too late. To obviate this, consultation should take place before the pattern-maker sets out the job.

Mr. D. Gordon Jones, junior vice-president of the South African branch, was the lecturer at the section's meeting on March 12. The subject on this occasion was "Foundry Metallurgy." Mr. Jones commenced his lecture by summarizing the properties of iron and followed this by explaining the effect of carbon on the metal. He dealt first, in this division, with metal containing carbon up to 1.9 per cent. and then discussed the class containing a higher carbon content. This was followed by a description of the effect of alloying elements in cast iron. The paper concluded with a metallurgical outline of the "grade" grey irons, malleable, white irons and spheroidal-graphite cast irons.

Sheffield

Another branch of the Institute which has held its annual general meeting is that of Sheffield and district. At this meeting on April 27, Mr. J. Richardson, of Brightside Foundry & Engineering Company, Limited, Sheffield, was elected branch president; Mr. J. H. Pearce, who has been secretary for ten years was elected senior vice-president, and re-elected secretary and treasure. Dr. R. V. Riley was elected junior vice-president.

North-east Lancashire Section

The accompanying photograph shows three of the principal members who participated in the annual dinner/dance of the North-East Lancashire section of

the IBF held at the Odeon Cinema, Accrington, on March 14. They are (left to right) Mr. D. Kershaw, junior vice-president; Mr. H. Barker, senior vice-president; and Mr. H. Tattersall, president. During the dinner Mrs. Tattersall was presented with a bouquet of flowers by Miss Harvey. Entertainment was provided by Mr. Morris Howarth, illusionist, and Miss Ann Brockley (singer).

THE COVENTRY AND DISTRICT SECTION of the Institute of British Foundrymen is holding a meeting on May 12 at Sterling Metals, Limited, Gipsy Lane, Nuneaton. The meeting will commence at 7.30 p.m. and Mr. T. A. Williams will be the lecturer on "Light-alloy Castings Production."

Company News

CRAVEN BROS. (MANCHESTER), LIMITED, machine-tool makers, etc., of Reddish, near Stockport (Ches)—The dividend is increased from 7½ per cent. to 10 per cent. with a final of 6½ per cent. for 1958. After £107,000 (£102,000) tax, the net profit is £126,111 (£114,958).

WILMOT-BREEDEN (HOLDINGS), LIMITED, manufacturers of automobile accessories, aircraft components, etc., of Birmingham—Group net profit expanded sharply from £382,287 to £532,330 in 1958 and the dividend is raised by 4 per cent. to 13 per cent. with a final of 8 per cent., against 6 per cent.

A.P.V. COMPANY, LIMITED, dairy, brewery, and chemical engineers, etc., of London, S.W.18—Group profits recovered from £222,255 to £368,599 for 1958, and dividends on the £1,250,000 ordinary are resumed, after a two-year lapse, with a 5 per cent. payment. A total of 10 per cent. was paid for 1955.

RADIATION, LIMITED—Group profits jumped from £188,898 to £1,020,912 in 1958. The figures, however, included those of the Parnall (Yate), Limited, group, which was merged a year ago. The dividend on the increased capital is 6 (5) per cent., which compares with a forecast of not less than 5 per cent.

WILLIAM JACKS & COMPANY, LIMITED, metal merchants, importers and exporters, of London, E.C.2—The whole of the ordinary capital of J. L. Clark & Company (Rhodesia), Limited, has been acquired, as from April 17. The directors are Mr. W. Gray Buchanan, Mr. P. D. Flint, and Mr. W. L. Walkerdine.

LAURENCE, SCOTT & ELECTROMOTORS, LIMITED—A scrip issue of one "A" ordinary share for every six "A" or "B" ordinary shares held is proposed by the company, which is repeating the 15 per cent. dividend on both classes of ordinary for 1958. Trading profits, etc., are little changed at £1,015,480 (£1,031,207).

BAKER PERKINS, LIMITED, manufacturing engineers and foundrymen, of Peterborough—The chairman, Mr. A. I. Baker, says that adverse factors will probably be reflected in a lower group profit for 1959, but the group is continuing its long-term design and development plans. Its financial position now makes it less vulnerable to credit restriction, and the board is confident that policies auger well for long-term stability.

R. B. PULLIN & COMPANY, LIMITED, gyroscopic engineers and scientific instrument manufacturers, of Brentford (Middx)—A rights issue of 1,778,000 2s. shares of 7s. 3d. each on a two-for-five basis to holders on April 29 is announced. The issue will produce £218,184 net after providing £386,800 for the purchase, now announced, of Neville Brown & Company, Limited, and Milbo Photographic, Limited (the Neville Brown group).

BABCOCK & WILCOX, LIMITED, makers of nuclear and conventional steam power plant, etc., of London, N.W.1—Group profits contracted to £3,277,626 (£4,589,990) for 1958, and after substantially reduced UK tax and minority interests the profit attributable to the company is £1,761,400 (£2,420,903). A final dividend of 7 per cent. makes 13 per cent., compared with a 7 per cent. interim on the smaller capital and a 6½ per cent. final on the present amount.

DARWINS GROUP, LIMITED, manufacturers of high-grade steels and castings, etc., of Sheffield—So far in the current year business has not been at a satisfactory level, states the chairman, Mr. F. Thompson-Schwab. Consequently, trading results to date have been disappointing, but he adds that there are signs that the recession has now reached bottom and that some gradual recovery may be expected. Even so, it is anticipated that it will take some time before the plant is again fully employed. Subject to no political upheaval the chairman is confident that trading conditions will in time become more normal, but he adds that there is no doubt that profits for some time will be harder to earn than in the past.

MAVOR & COULSON, LIMITED, mining-equipment manufacturers, etc., of Glasgow—The directors state that orders booked in 1958 decreased considerably on 1957, and the value of orders in hand is much lower than a year ago. This is a result of the policy of retrenchment adopted by the National Coal Board, orders for new equipment and spares having been cut to a minimum. This was a serious reverse coming from the company's largest customer and turnover is likely to drop in the current year. Meanwhile, strenuous efforts are being made to extend business overseas and in materials-handling equipment. Stocks of selected products are being built up to give quick deliveries when demand improves, and new types of equipment are being developed.

Scrip Issue by Atlas Steel Foundry & Engineering

Directors of the Atlas Steel Foundry & Engineering Company, Limited, Armadale (West Lothian), propose a scrip issue of 1,000,000 5s. ordinary shares which Hart Son & Company will be prepared to buy with a view to making a freer market. The market for the existing ordinary capital of 500,000 5s. units, quoted in London and Glasgow, it is stated, has been very restricted. Following a professional valuation of April 15, the directors have revalued heritable subjects at £310,070 and put the resultant surplus of £290,861 to capital reserve.

To bring issued capital more into line with net assets and earning capacity, it is proposed to capitalize £250,000 of capital reserve in a two-for-one scrip issue to holders of April 18.

On the basis of internal accounts for six months to March 31, 1959, and orders in hand, the directors expect profits for the year to September 30 will be appreciably below last year's £286,066, but not less than £220,000. They intend to declare an interim dividend of 5d. a unit on the increased capital of £375,000 in June and expect the final will be 7d. a unit.

Successful Policy of Ransomes, Sims & Jefferies

Last two years' policy in concentrating production, closing and selling smaller properties, and closely scrutinizing all expenses has been successful, states Sir Reuben Hunt, chairman of Ransomes, Sims & Jefferies, Limited, engineers and ironfounders, makers of agricultural machinery, etc., of Ipswich. Commenting on the future, Sir Reuben says that the company could face the future with some confidence if not optimism.

"As conditions in both home and export markets are becoming more competitive there is no margin for increased wage rates unrelated to productivity; neither can we support further demands from any source without increasing our prices and reducing our personnel," he adds. Group net profit expanded to £242,405 (£96,501) and the dividend is being effectively increased with a special 1½ per cent. interim for the current year payable with the maintained 6 per cent. for 1958.

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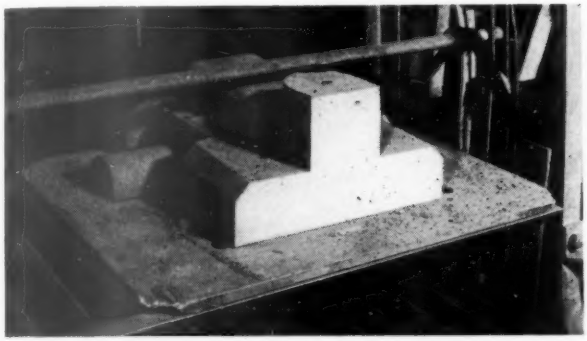

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News in Brief

THE UNITED KINGDOM TRADE DELEGATION to the USSR, led by the President of the Board of Trade, the Rt. Hon. Sir David Eccles, K.C.V.O., M.P., left London Airport last Tuesday.

G. & J. WEIR, LIMITED, the Glasgow engineers have received an order from the Government of Kuwait for a "fresh water from sea water" plant, which, it is claimed, will be the largest in the world.

THE PRESIDENT OF THE BOARD OF TRADE announced in Parliament that the Export Credits Guarantee Department was now in a position to resume credit insurance cover on exports to Indonesia.

THREE 40-TON ARC-MELTING FURNACES, valued at about £300,000, have been made by Birlec, Limited, Birmingham, for the new £2,000,000 steelworks project of the Brymbo Steel Works, Limited, near Wrexham.

Sir DAVID ECCLES, K.C.V.O., M.P., President of the Board of Trade, last Monday formally opened the aviation, marine and industrial divisions of S. Smith & Sons (England), Limited, Kelvin House, Wembley.

THE ANNUAL GENERAL MEETING of the Leeds Metallurgical Society was held at Leeds University last Thursday evening. It was followed by a lecture on "Electric Melting Furnaces" by Mr. F. S. Leigh, B.SC.

WORK ON A NEW SECTION of the Tatabánya aluminium foundry in Hungary, which was stopped in 1954, is to be re-started. Planned to be ready for production by the end of July it will increase output at the foundry by 5,300 tons.

THE ALLOYS DIVISION of Union Carbide, Limited, announces the opening of a new Birmingham office, at 92 Newhall Street, Birmingham, 3. (Telephone: Central 5011.) Mr. Edward Pickard, southern-area representative, is already located at the new address.

"MAGNETIC POWER AT WORK": Mr. T. G. Hawker, B.SC., A.M.I.E.E., is planning his next session of lectures. The secretaries of electrical, mechanical, and allied societies who may be interested should communicate with him c/o Rapid Magnetic Machines, Limited, Lombard Street, Birmingham, 12.

TO CELEBRATE its jubilee the Institution of Structural Engineers is holding an exhibition in Birmingham (last day, May 8) at the James Watt Memorial Institute. The Lord Mayor of Birmingham, Ald. Donald Johnstone, performed the opening ceremony. Members of the Institution attended a civic reception at Birmingham Council House.

UNEMPLOYMENT FELL BY 20,000 between mid-March and mid-April to 531,000, or 2.4 per cent. of the working population, compared with 2.5 per cent. for the previous period and 2.0 per cent. a year ago. The drop is mainly seasonal and shows little change in the economic position. The number of unfilled vacancies on April 8 was 98,000, 17,000 more than in March.

SOME TWENTY MEMBERS of the Winnipeg, Canada, Chamber of Commerce were the guests at a luncheon, on May 1, of the Coventry Chamber of Commerce. Leading the party was Mr. R. H. G. Bonnycastle, vice-president of the Winnipeg Chamber, who was presented with an inscribed box containing a tape recording of speeches made at the luncheon.

ON APRIL 30, the chairman of Cannock Urban Council, Councillor J. Holston, cut the first sod on the 13-acre site where Bowmakers (Plant), Limited, is to build new premises at a cost of more than £300,000. The company plans to move from Willenhall because it has outgrown its premises there. The Cannock premises will provide 85,000 sq. ft. as compared with 50,000 sq. ft. at Willenhall.

THE SWAN RIVER is now making its maiden voyage to South America carrying in its holds a considerable proportion of a £500,000 annealing plant for the Sociedad Mixta Siderurgia Argentina. This plant, built by the Incandescent Heat Company, Limited, Smethwick, is capable of annealing 300,000 tons of steel a year. The furnaces are supplied as packaged units completely assembled in Great Britain.

MAGNESIUM ELEKTRON, LIMITED, who three years ago brought forward a £1,000,000 scheme for quarrying and processing dolomite, at Hopton, Derbyshire, have now informed Wirksworth Urban Council that they are proceeding with the scheme. The company states that there has been no withdrawal of interest although the plans have not progressed as quickly as seemed possible at first. It is hoped to extract the mineral over a site of 100 acres.

UNDER AN AGREEMENT recently concluded between Short Brothers & Harland, Limited, Belfast, and Conveyancer Fork Trucks, Limited, Warrington, the latter company has been appointed sole distributors at home and overseas of straddle carriers manufactured by Shorts in Northern Ireland. These vehicles, hitherto known as British straddle carriers, will in future be known as the "Shorland" range of carriers. Conveyancer Fork Trucks, who already handle a range of mechanical-handling equipment, will assume responsibility for all marketing and selling activities.

THE BRITISH ENGINEERS' ASSOCIATION, 32, Victoria Street, London, S.W.1, are planning a trans-Canada exhibition train. This train will consist of up to 60 specially-designed show cars to carry a comprehensive exhibition of UK engineering products from coast to coast across Canada during May and June of 1960. Starting at Vancouver and mounting exhibitions at not less than six of Canada's main industrial centres on the way, the journey will take approximately two months and is expected to cost about half a million pounds. Calgary, Edmonton, Winnipeg, Toronto, Montreal, Ottawa and Halifax are among centres likely to be visited.

A SALES AND ADVERTISING CAMPAIGN started about two-and-a-half years ago by Firth-Vickers Stainless Steels, Limited, Sheffield, has been so successful, it is reported in the firm's quarterly magazine, *Staybrite*, that despite the general recession in industry, all the extensions at the firm's subsidiary company, Shepcote Mills, Limited, and the new Firth-Vickers 12-in. strip mill have been kept fully occupied. It says the decline in orders for the aircraft industry because of government policy was foreseen and the campaign was started to create new markets in different fields. These included the use of stainless steel for motor-car trim and for domestic products such as saucepans, teapots, spoons and forks.

A NEW COMPANY, Kitchen & Walker, Limited, with a capital of £60,000, has been formed to carry on business as machine-tool makers at Hexagon Works, Pellon Lane, Halifax. The managing director of the new concern is Mr. Donald Walker, former deputy chairman and managing director of Kitchen & Wade, Limited, machine-tool makers, Halifax, which a few weeks ago was taken over by the Asquith Machine Tool Corporation, Limited. Mr. Walker, with Mr. Albert Kitchen (the chairman) and one other director, resigned from the board of Kitchen & Wade, Limited, following the completion of the successful take-over bid. The newly-formed company expects to begin production within a few months.

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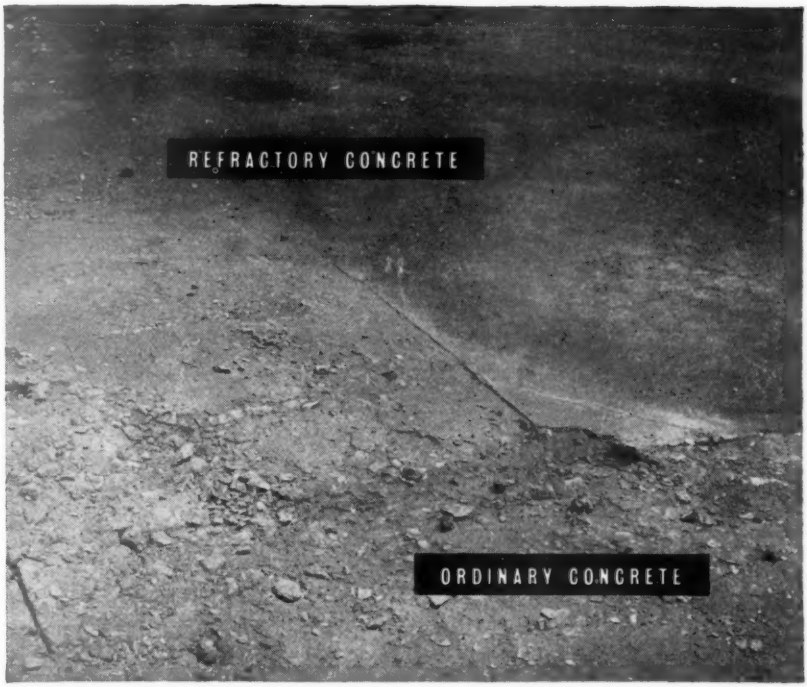

Molten material ran over this floor, part of which was of ordinary concrete, whilst the portion nearest the furnace was of Refractory Concrete. The ordinary concrete disintegrated completely, but the Refractory Concrete was unaffected. (A corner is broken off the latter for the purpose of identification.)

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Death of Sir William Larke

Sir William Larke, a leading figure for many years in the metallurgical and iron and steel industries, died on April 29 at the age of 84. Sir William served with H. F. Joel & Company and Siemens Bros. & Company, Limited, Woolwich, and the British Thomson-Houston Company, Limited, before accepting an appointment with the Ministry of Munitions during the first world-war. This appointment culminated in his becoming Director-General of Raw Materials. With the formation of the National Federation of Iron and Steel Manufacturers, Sir William accepted an invitation to become its director, and the early activities of the Federation resulted in the formation of the British Iron and Steel Federation and the British Iron and Steel Research Association.

BISRA carries on the work of the Iron and Steel Industrial Research Council of which Sir William was chairman from 1938 to 1945. Early in 1939, as chairman of its tariffs and commercial relations committee, he led the British delegation from the Federation of British Industries to the conference in Düsseldorf organized by the *Reichgruppe Industrie,* the German counterpart of the FBI. The delegation's main purpose was commercial but it returned primed with information which was to prove invaluable when war broke out a few months later. Sir William then became chairman of the Advisory Committee on Non-Ferrous Minerals at the Ministry of Supply and early in 1942 he was appointed controller of non-ferrous mineral development, a post he held until the end of the war. He was the elected vice-president of the Iron and Steel Institute (1946) and was awarded its Bessemer Medal.

Other Positions Held

In addition to those mentioned, Sir William in his long career held many other important positions in the world of metals and engineering. He was president of the Institute of Fuel in 1933-34, the Junior Institution of Engineers in 1936-37, the Institute of Welding from 1938 to 1942, and the British Standards Institution in 1949 and 1950.

For a number of years, he was a member of the Advisory Council to the Committee of the Privy Council for Scientific and Industrial Research and he was a member of the Institution of Electrical Engineers, a Fellow of the Institute of Fuel, a member of the Institution of Mechanical Engineers and an honorary Doctor of Science of the University of Durham.

He was well known far beyond the field of metallurgy and engineering, not only for his wide scientific knowledge and great practical experience, but also for his wisdom and humanity. Many tributes were paid to him four years ago when he reached his 80th birthday, on which occasion the late Sir Claude Gibb, F.R.S., presided at a luncheon in his honour, arranged by the Institute of Welding and the British Welding Research Association. He was then presented with the honorary Fellowship of the Institute. He was made honorary member of the Iron and Steel Institute also, in April 1955. Sir William was made O.B.E., in 1917, C.B.E., in 1920, and was knighted in the Order in the following year.

CERTIFIED ATTENDANCE at the 1959 Factory Equipment Exhibition and the associated Heat and Sound Insulation Exhibition was 51,124, an increase of 12,579 over last year. This year's figure included visitors from 68 countries oversea.

British Standards Institution

A new standard issued by the British Standards Institution, B.S. 1870, Part 2: Rubber safety boots, deals with footwear of the laced rubber ankle pattern and the knee-length pattern. Each type may be made in either of two forms of construction: compounded rubber latex or calendered sheet-rubber compound. The ten-page publication specifies minimum qualities for the materials used, together with construction details and the necessary tests and test requirements.

Among the searching tests is one for protection against blows on the toe, to prove that the toe-cap is to Grade 1 of B.S. 953, "Strength tests for protective toe caps"; and a leakage test is designed to ensure the entire boot is waterproof. Again, the rubber components are also tested for their tensile strength and elongation, both before and after either of two forms of artificial ageing. The uppers in their turn are submitted to a large number of continuous flexes (80,000 to 100,000 depending on thickness), to ensure good materials and good manufacture.

Marking requirements call for the Certification Mark of the BSI. By this means, users will have independent assurance that the safety boots have been "batch sampled" and the further assurance that samples have also been taken from the open market. Only when these samples have passed all tests will the licence for the continued use of the "Kite Mark" be permitted.

Another new publication of the Institution supersedes the earlier series of standards for magnesium-alloy ingots and castings—B.S. 1272-1280. In this the requirements of the earlier standards have been amended in the light of more recent experience in magnesium-alloys, and specifications for pure-magnesium ingots, and for five new alloys in various conditions, have been added.

The new specification has been modelled on B.S. 1490 (Aluminium-alloy ingots and castings) in that general requirements are grouped in sections one and two for ingots and castings respectively, and specific requirements for each material are included in separate sections. Alloy numbers have been allocated to each material prefixed by the letters "MAG" and symbols are used to indicate form and condition, as in B.S. 1490.

Copies of these standards may be obtained from the sales branch of the Institution, 2, Park Street, London, W.1; price 4s. and 8s. 6d. respectively (postage extra to non-subscribers).

British Firms' Orders for Power Stations

During the past month contracts worth £7,600,000 for power stations, transmission lines, and transforming stations have been placed with British industry by the Central Electricity Board. The latest is a £250,000 contract awarded to the Mitchell Construction Company, Limited, for two reinforced concrete, national draught, hyperbolic cooling towers for the Padiham "B" Power Station (Lancs). Work will begin in May.

Transformer contracts have been won by Metropolitan-Vickers Electrical Company, Limited, Hackbridge & Hewittic Electric Company, Limited, C. A. Parsons & Company, Limited, British Thomson-Houston Company, Limited, Crompton Parkinson, Limited, Johnson & Phillips, Limited, Brush Electrical Engineering Company, Limited, and Ferranti, Limited. Among companies which won orders for switchgear were BTH, General Electric Company, Limited, Metropolitan-Vickers Electrical Company, and A. Reyrolle & Company, Limited.

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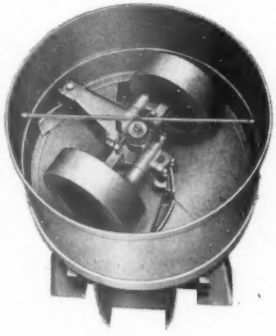

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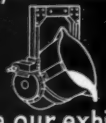

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Personal

Mr. T. H. BETTS, general manager of Charles H. Pugh, Limited, has been appointed a director.

Mr. W. HACKETT, jnr., and Mr. R. D. YOUNG have been appointed assistant managing directors of Tube Investments, Limited.

Mr. A. VAN RHEE has relinquished his position of works director of Markham & Company, Limited, and has resigned his seat on the board.

Mr. H. T. HILL has been appointed a director and general manager of Wellworthy, Limited, one of the Associated Engineering group of companies.

Alderman A. G. B. OWEN, chairman and managing director of the Rubery Owen Group, has been re-elected chairman of Staffordshire County Council.

Mr. SYDNEY BATES, secretary, commercial manager and local director of the Consett Iron Company, Limited, has decided for reasons of health to retire at his 60th birthday in July.

Mr. GEORGE WILSON has been appointed Scottish technical representative for heavy press and fabricating work, engineering products, etc., for the Carron Company, ironfounders, Falkirk.

Dr. C. J. DADSWELL, a director of English Steel Corporation, Limited, Sheffield, has been re-elected to the Council of the Institution of Mechanical Engineers for a further term of three years.

Mr. W. A. JENKINS, director of Robert Jenkins & Company, Limited, engineers, Wortley Road, Rotherham, was elected president-elect of Rotherham Chamber of Commerce at the annual meeting on April 27.

Sir GEORGE BRIGGS has been appointed a part-time member of the London Electricity Board. Sir George is managing director of Hawker Siddeley Industries, and a director of Thomas Tilling, Limited, and other companies.

Mr. F. H. TOWLER is relinquishing his position as managing director of Towler Brothers (Patents), Limited, Rodley, Leeds. He will remain, however, vice-chairman of the company. Mr. E. JONES will succeed him as managing director.

Mr. W. PERCY MCGEOGH, works managing director of William McGeogh & Company, Limited, brassfounders and electrical engineers, Coventry Road, Birmingham, has been elected junior vice-president of the National Brassfoundry Association and has been re-elected hon. treasurer.

Col. A. JERRETT who has retired from the post of managing director of Guy Motors, Limited, for health reasons, and Mr. C. OWEN SILVERS who has resigned his directorship of the Sunbeam Trolley Bus Company, Limited, an associated company, have received presentations from their fellow directors.

Mr. R. GAVIN ORR has been appointed managing director of T. C. Jones & Company, Limited, a subsidiary of the George Cohen 600 Group. Mr. Orr was elected to the board of T. C. Jones earlier this year and, as managing director, succeeds Mr. I. LEVIN, who is approaching retiring age. Mr. Levin remains a director of T. C. Jones.

Sir ALEXANDER LOWE MCCALL, chairman of Alley & MacLellan, Limited, Glasgow, and a director of Alley & MacLellan (Polmadie), Limited, has retired from the chairmanship of the Superheated Company, Limited, Manchester, after 35 years as a director and 15 years as chairman. He has been succeeded by Mr. ERIC A. ROBINSON, at present vice-chairman and managing director.

Mr. THOMAS HOOD, assistant chief draughtsman with International Combustion Limited, Derby, has been elected president of the Derby Society of Engineers. Other officers elected were: as chief patron, Mr. C. W. MURRY; as president-elect, Mr. D. MACFARLANE; as secretary and treasurer, Mr. B. BABB; as deputy secretary and treasurer, Mr. A. TELFER; and as auditor, Mr. C. W. SHENTON.

Mr. W. BODEN has been appointed general manager technical service department of Stanton Ironworks Company, Limited, near Nottingham. Mr. Boden joined the company in 1922 and has been manager of the department since 1943. Mr. E. N. ANDREWS who will succeed Mr. Boden as manager of the technical service department joined the company in 1931 and has been assistant-manager of the department since 1950.

Mr. J. BELL, chairman of the local board of Armstrong Whitworth (Metal Industries), Limited, is visiting Canada with the purpose of familiarizing Canadian manufacturers with European metallurgical research and development, particularly on iron and steel rolls. The present position in Canada is that there is no major steel-roll-producing plant and most rolls are imported from the United States. Mr. Bell will leave Canada on May 26.

Honorary associateships were conferred on Lt.-Gen. Sir THOMAS HUTTON, former director of the British Productivity Council, and on Mr. W. K. BRASHER, secretary of the Institute of Electrical Engineers, at the annual associateship presentation ceremony of the Birmingham College of Technology. Sir VINCENT TEWSON, general secretary of the TUC was unable to be present to receive his honorary associateship because of illness. More than 150 diplomas of associateship were presented to students and 35 of them received the first awards to be made in the UK of the Diploma of Technology (engineering).

Mr. WILFRED HILES, a past-president of the Bradford Engineering Society, was presented with a certificate of life-membership at the sixtieth annual dinner of the Society on May 1. Mr. Hiles recently retired from the engineering firm of Newton, Bean and Mitchell, Dudley Hill, Bradford, after 53 years of continuous service. He recalled that when he joined the Bradford Society half a century ago 100 lb. per sq. in. was a formidable pressure, but nowadays pressures of 20 times that figure had passed beyond the experimental stage, which was some indication of the progress made in engineering during his lifetime. Mr. Hiles has the distinction of being the oldest past-president of the Bradford Society, which he has served for 50 years. His father, the late Mr. Robert Hiles, a founder member, became the first honorary life member in 1932.

Obituary

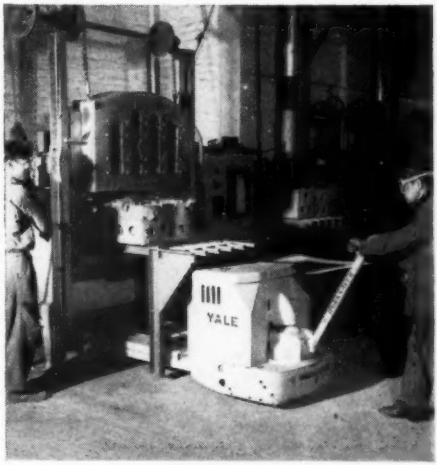
At the age of 45 years the death took place recently of Mr. F. H. KELLY of Kelly & Cleaver, Limited, ironfounders, of London.

Mr. W. H. HARROP, iron and steel merchant, of Collegiate Crescent, Sheffield, has died. He was a former national and Sheffield president of the Old Contemptibles' Association.

COST CUTTING IN FOUNDRIES

Yale trucks save time, reduce accident risks

Many famous British foundries now use Yale industrial trucks and hoists to reduce operation times, to increase safety and lessen fatigue, to reduce costs. For years Yale & Towne has helped solve many problems of handling molten metal, castings and other materials. This experience is at the service of any foundry. That is the purpose of the Yale Advisory Service.

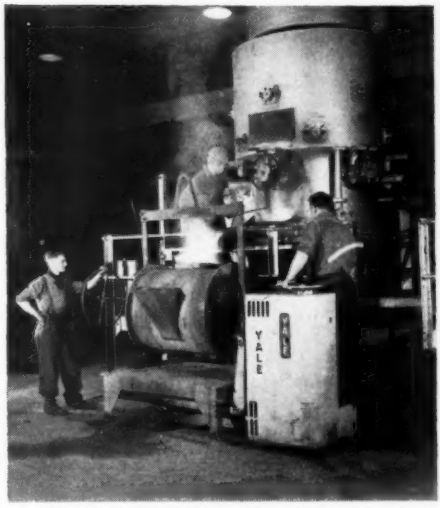


Saving time . . .

Catton and Company Limited of Leeds designed a furnace charger consisting of a steel frame counterweighted at the rear and with prongs at the front, with sufficient underclearance to allow it to be lifted by a Yale platform Worksaver. The brick floor of the furnace was recessed to take the charger prongs. The Worksaver delivers the castings right into the furnace. Lowering the truck's platform leaves the castings resting securely on the fire brick. Truck and charger are then withdrawn. Hot castings are removed by a reversal of this procedure.

Before this method was devised, charging was accomplished manually, taking 1½ hours, during which time the furnace temperature fell to 300°C. The complete heat treatment cycle took 14 hours. Now, clearing and charging take only 5 minutes; the temperature falls to 600°C.; the heat treatment cycle is only 6½ hours. The savings in power consumption and furnace time have increased Catton's productivity — *and* lessened manual fatigue.

Yale Worksavers are available in Platform or Pallet models (2 or 3 tons): Fork Lift (1,500, 2,000, 2,500, 3,000 lbs.). Tractor (700 lbs. draw bar pull).



Reducing accidents . . .

The Hill Top Foundry, in Staffordshire, uses Yale electric platform Warehouser trucks to transport molten metal between furnaces and moulding bays. The metal is tapped from the furnace into a rotatable ladle fixed to a specially designed stillage — a load of some two tons.

A major factor in determining the choice of this Yale truck was the high degree of stability required both during transport and pouring.

Yale Warehousers are available in Platform models (2 tons); Fork Lift models (2,000 and 3,000 lbs.).

The Yale range includes power trucks for every load up to 200,000 lbs.: Hand Trucks for loads up to 12,000 lbs.: Hoists for lifting up to 40 tons (trolleys for all models); Pul-Lifts (from ¾ to 15 tons).

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Raw Material Markets

Iron and Steel

Compared with the first quarter of 1958, pig-iron production for the same period this year shows a reduction in the average weekly rate of about 7,000 tons. Only 81 furnaces are now in blast and from many of these outputs are regulated to more evenly balanced demands. Most producers of all grades of pig-iron hold appreciable tonnages in stock and are making strenuous efforts to reduce the level of their commitments.

Additional blast-furnace capacity is available to meet an upsurge in demand, but at present the call for all grades is insufficient to absorb the tonnages from current production and from stock. Although there are signs of an increase in the requirements of steel ingots, stocks of basic pig-iron at the steelworks and the furnaces together with current deliveries are adequate.

There is also no shortage in the foundry grades of pig-iron, and producers generally could handle a much larger demand than at present. The low-phosphorus irons continue comparatively in much better demand than other grades, and most of the several brands which can now be obtained are freely available so that the foundries producing high-quality castings have no difficulty in covering for their requirements. Their needs of hematite are also easily met, as are those using refined irons.

In the high-phosphorus irons, while the slightly better demand continues, there is still a wide gap between present consumption and productive capacity. Even from the reduced outputs now being obtained producers find difficulty in disposing fully of their outputs and they still hold heavy stocks.

The light foundries supplying castings to the domestic utensil trade continue to do better and some improvement for builders' castings is reported. Many of the jobbing foundries are fairly well employed, but the textile foundries are very slack. Substantial tonnages of high-duty castings continue to be called for, and the engineering and speciality foundries maintain a fairly good level of production, particularly those supplying the motor-car industry. There has been a slight improvement in demands from the machine-tool trade, but generally the foundries concerned are short of work.

Demands for heavy cast-iron and machinery scrap are maintained and arisings are readily disposed of. Foundry coke deliveries are satisfactory, and ganister, limestone, and firebricks are in good supply.

Demands for the products of the re-rollers vary, but they are totally insufficient to enable them to show any appreciable improvement on recent outputs. Demands for small bars and light sections are moderate and most of the mills, particularly those in the English Midlands, are working short time and with little prospect of any improvement in the near future. A fairly good demand for reinforcing rods is maintained.

There has been a slight improvement in the call for steel semis, but home steelworks could supply a much larger quantity than that at present called for.

Non-ferrous Metals

Mixed feelings about the near-term outlook for copper is the dominating feature in markets on both sides of the Atlantic. In London demand is sporadic and, on balance, the market can be described as quietly steady. The continuous increase each week in the copper stocks has been duly noted by consumers and the market has reflected this position by a widening of the contango on three months' metal. At the end of last week stocks of refined copper in LME warehouses stood at 10,741 tons.

In the US trade circles seemed to have had second thoughts about the Washington announcement that if, and when, the stockpile authorities do release copper from the stockpile only 5,000 tons will be released at a time, and that, in any event, no metal would be released at the present time. The feeling now is, of course, that metal will probably be released if prices rise too sharply. Labour unrest at Potrerillos helped sentiment, but the market failed to get going as one custom smelter lowered its price by ¼ cent to 32 cents a pound. Thus the US custom smelter price position is a split quotation of 32-32¼ cents a pound, with producers continuing to quote 31½ cents a pound.

The shape of things to come in the field of labour negotiations was perhaps forecast when the International Union of Mine, Mill, and Smelter Workers served notice on Kennecott Copper Corporation that it is reopening its contract to seek substantial general increase and nine other objectives. Negotiations for all the mines will begin in the middle of this month as the labour contracts expire on June 30. The union says that its contracts cover 25,000 to 30,000 workers.

Tin continues to be a steady market with stocks in the UK declining each week. At the end of last week the tonnage in LME stood at 8,517 tons, the lowest level since December, 1957. Demand is also steady in Singapore and in America, where the price is above $1.02 a pound. In London it is believed that the buffer stock manager has been operating in the market.

Lead is still a sluggish market both in London and in New York, where the price is holding at 11¼ cents a pound. The current talks in New York may result in producers cutting back production to help steady the price. The feeling in the US is that it is better to cut production than to have the Government interfering further in the market. The foregoing comments apply with equal force to the zinc market, which is also dull on both sides of the Atlantic. The East St. Louis spot price remains at 11 cents a pound.

Increased Dividend and Scrip Issue By C. & W. Walker

Increased profits, dividend raised from 12½ per cent. to 35 per cent., a one-for-two ordinary scrip issue, and the proposed conversion of the 7½ per cent. non-cumulative preference into participating preference in exchange for certain restrictions of existing voting rights, are announced by C. & W. Walker, Limited, gas, chemical, and constructional engineers, of Donnington, near Wellington (Salop).

A few weeks ago, in notifying holders of a bid approach on indicated terms they did not consider acceptable, the directors strongly recommended holders not to sell. They also forecast a substantially higher dividend for the year to January 31, 1959.

The tentative offer terms were 10s. per 5s. ordinary and £1 per £1 preference, made on behalf of clients by Contanglo Banking & Trading, Limited, which later announced that, in view of the board statement, the terms would be reviewed when C. & W. Walker's accounts were available.

The Walker group 1958-59 net profit is £49,189 (£37,943) after tax of £46,706 (£43,549), and the balance, after minority interests, is £46,124 (£34,020). The scrip issue will be made to holders registered May 6, and will be submitted for approval at the meeting to be held on May 21.

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Current Prices of Iron, Steel, and Non-ferrous Metals

(*Delivered unless otherwise stated*)

May 6, 1959

PIG-IRON

Foundry Iron.—No. 3 IRON, CLASS 2: Middlesbrough, £21 6s. 0d.; Birmingham, £20 18s. 3d.

Low-phosphorus Iron.—Over 0.10 to 0.75 per cent. P, £23 17s. 0d., delivered Birmingham. Staffordshire blast-furnace low-phosphorus foundry iron (0.10 to 0.50 per cent. P, up to 3 per cent. Si), d/d within 60 miles of Stafford, £24 1s. 3d.

Scotch Iron.—No. 3 foundry, £25 3s. 6d., d/d Grangemouth.

Cylinder and Refined Irons.—North Zone, £25 19s. 0d.; South Zone, £26 1s. 6d.

Refined Malleable.—P, 0.10 per cent. max.: North Zone, £27 6s. 6d.; South Zone, £27 9s. 0d.

Hematite.—Si up to 2 per cent., S. & P. over 0.03 to 0.05 per cent.: N.-E. of England (local iron), £25 6s. 6d.; Scotland (Scotch iron), Zone S.1, £25 13s. 0d.; Sheffield, £26 15s. 0d.; Birmingham, £27 4s. 0d.; Wales (Welsh iron), £25 6s. 6d.

Basic Pig-iron.—£20 3s. 0d., delivered Staffs, Derbyshire, Notts, Lincs, Rutland, Northants, and Leics.

FERRO-ALLOYS

(*Per ton unless otherwise stated, delivered*)

Ferro-silicon (6-ton lots and over).—45 per cent. Si, £41 0s. 0d. to £43 10s. 0d., scale 15s. 0d. per unit; 75 per cent. Si, £56 10s. 0d. to £60 10s. 0d., scale 15s. 0d. to 16s. 0d. per unit.

Ferro-vanadium.—50/60 per cent., 22s. 6d. per lb. of V.

Ferro-molybdenum.—65/70 per cent., carbon-free, 12s. 10d. per lb. of Mo.

Ferro-titanium.—20/25 per cent., 2-3 per cent. Cu, £250 0s. 0d.; 38/40 per cent., commercially carbon-free, £287 0s. 0d.

Ferro-tungsten.—80/85 per cent., 8s. 1d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 11s. 1d. per lb. of W.

Ferro-chrome (6-ton lots and over).—4/6 per cent. C, £77 0s. 0d. to £81 0s. 0d., basis 60 per cent. Cr, scale 26s. 0d. to 27s. 6d. per unit; over 6 per cent. C, £74 10s. 0d. to £77 10s. 0d., basis 60 per cent. Cr, scale 26s. 0d. to 27s. 6d. per unit; 2 per cent, C,* 1s. 7½d. to 1s. 10½d. per lb. Cr; 1 per cent. C,* 1s. 8d. to 1s. 11d. per lb. Cr; 0.15 per cent. C,* 1s. 9d. to 2s. 0d. per lb. Cr; 0.10 per cent. C,* 1s. 9½d. to 2s. 0½d. per lb. Cr; 0.06 per cent. C,* 1s. 9¾d. to 2s. 0¼d. per lb. Cr.

Metallic Chromium.—98/99 per cent., 6s. 10d. per lb.

Metallic Manganese.—94/96 per cent., carbon-free, £245 0s. 0d.; 96/98 per cent., £275 0s. 0d.

Ferro-columbium.—65/72 per cent., Cb + Ta, 19s. 9d. per lb., Cb + Ta.

Ferro-manganese (standard).—78 per cent., £69 10s. 0d.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—BASIC: Soft u.t., £32 15s. 6d.; tested, 0.08 to 0.33 per cent. C, £33 15s. 6d.; hard (0.41 to 0.60 per cent. C), £34 17s. 0d.; silico-manganese, £43 16s. 6d.; free-cutting, £36 14s. 6d. SIEMENS MARTIN ACID: Up to 0.25 per cent. C, £41 1s. 0d.; silico-manganese, £44 4s. 0d.

Billets, Blooms, and Slabs for Forging and Stamping.—Basic, soft up to 0.33 per cent. C, £38 10s. 0d.; basic hard, over 0.41 up to 0.60 per cent. C, £39 12s. 6d.; acid up to 0.25 per cent. C, £43 4s. 0d.

FINISHED STEEL

Heavy Plates and Sections.—Ship plates (N.-E. Coast), £42 2s. 0d.; boiler plates (N.-E. Coast), £44 12s. 0d.; floor plates (N.-E. Coast), £43 11s. 0d.; angles (N.-E. Coast), £39 16s. 6d.; joists (N.-E. Coast), £39 12s .6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in., and flats 5 in. wide and under, untested soft basic, 50 tons and over, £40 0s. 6d.; under 10 tons to 4 tons, £40 18s. 0d.; under 4 tons to 2 tons, £41 3s. 0d.; hoop and strip, coils, £39 0s. 0d.; uncoated strip mill coils, hot rolled, under 3mm. to 12g., £44 16s. 0d.; black sheets (hand mill), 24g., £58 14s. 6d.; galvanized corrugated sheets, 24g., £67 10s. 0d.

Alloy Steel Bars.—1 in. dia. and up: Nickel, £68 10s. 0d.; nickel-chrome, £99 11s. 0d.; nickel-chrome-molybdenum, £111 19s. 0d.

NON-FERROUS METALS

Copper.—Cash, £232 5s. 0d. to £232 10s. 0d.; three months, £233 15s. 0d. to £234 0s. 0d.; settlement, £232 10s. 0d.

Copper Tubes, etc.—Solid-drawn tubes, 2s. 3½d. per lb.; rods, 254s. 6d. per cwt. basis; 20 s.w.g., 289s. 6d. per cwt.

Tin.—Cash, £783 10s. 0d. to £784 0s. 0d.; three months, £784 0s. 0d. to £784 10s. 0d.; settlement, £784 0s. 0d.

Lead (Refined Pig).—First half May, £71 2s. 6d. to £71 5s. 0d.; first half August, £72 2s. 6d. to £72 5s. 0d.

Zinc.—First half May, £76 5s. 0d. to £76 10s. 0d.; first half August, £75 5s. 0d. to £75 10s. 0d.

Zinc Sheets, etc.—Sheets, 15g. and thicker, all English destinations, £110 0s. 0d.; rolled zinc (boiler plates), all English destinations, £107 15s. 0d.; zinc oxide (Red Seal), d/d buyers' premises, £94 0s. 0d.

Brass Tubes, etc.—Solid-drawn tubes, 1s. 10½d. per lb.; sheets to 10 w.g., 197s. 3d. per cwt.; wire, 2s. 7¾d.; rolled metal, 197s. 3d. per cwt.

Brass (Brazing).—BS1400, B3 (65/35), £155; B6 (85/15), £195.

Brass (High Tensile).—BS1400, HTB1 (30 tons), £189; HTB2 (38 tons), —; HTB3 (48 tons), £214.

Gunmetal.—BS1400, LG2 (85/5/5/5), £192; LG3 (86/7/5/2) £203; G1 (88/10/2/½), £260; (88/10/2/1), £240.

Phosphor Bronze.—BS1400, PB1 (AID released), £290 per ton.

Leaded Phosphor Bronze.—BS1400, LPB1 (1060), £210 per ton.

Phosphor Bronze Strip, etc.—Strip, 290s. 6d. per cwt.; wire, 4s. 1d. per lb.; rods, 3s. 4d.; tubes, 3s. 4d.; chill cast bars: solids 3s. 3½d.; cored 3s. 4½d. (CHARLES CLIFFORD, LIMITED.)

Nickel Silver, etc.—Rolled metal, 3 in. to 9 in. wide × 0.056, 3s. 9½d. per lb.; round wire, 10g in coils (10 per cent.), 4s. 2¾d.; special quality turning rod, 10 per cent., ½ in. dia., in straight lengths, 4s. 1¾d. All prices are net.

Other Metals.—Magnesium, ingots, 2s. 3d. per lb. Antimony, English, 99 per cent., £190 0s. 0d. Quicksilver ex-warehouse, £79 0s. 0d. Nickel, £600 0s. 0d. Aluminium, ingots, £180 0s. 0d.; aluminium bronze (BS1400), AB1, £230; AB2, £236.

* Average 68-70 per cent.

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Pig-iron and Steel Production

Statistical Summary of February Returns

The following particulars of pig-iron and steel produced in Great Britain are from statistics issued by the British Iron and Steel Federation. Table 1 summarizes activities during recent months. Table 2 gives production of steel ingots and castings in February. Table 3, weekly average production of finished steel in January. Table 4 gives the production of pig-iron and ferro-alloys in February, and furnaces in blast. (All figures are weekly averages in thousands of tons.)

TABLE 1.—*Iron and Steel Price Index and General Summary of Pig-iron and Steel Production.*

Period.	B.o.T. Price Index, 1938 = 100.			Iron-ore output.	Imported ore used.	Coke sent to blast-furnaces.	Pig-iron, ferro-alloys prod.	Scrap used in steel prod.	Steel (incl. alloy).			
	Iron and steel.	Coal.	Basic materials excl. fuel [1]						Imports. [2]	Prod. ingots, castings.	Delivrs. finished steel.	Stocks. [3]
1957	328	488	537	325	303	270	275	220	14	417	322	1,444
1958—Sept. ..	341	496	470	271	241	211	231	198	6	369	279	1,621
Oct. [4] ..	341	509	473	294	237	215	242	195	4	384	269	1,610
Nov. ..	341	509	476	289	237	210	234	187	5	352	281	1,563
Dec. [4]	341	509	471	269	230	206	223	166	4	314	239	1,547
1959—Jan. ..	342	508	471	273	236	203	229	189	4	358	266	1,572
Feb. ..	342	508	471	277	214	199	222	190	5	349	—	1,500

TABLE 2.—*Average Weekly Production of Steel Ingots and Castings in February*, 1959.

District.	Open-hearth.		Bessemer.	Electric.	All other.	Total.		Total ingots and castings.
	Acid.	Basic.				Ingots.	Castings.	
Derbys, Leics, Notts, Northants, and Essex ..	—	3.2	13.9 (basic)	1.8	0.1	17.6	1.4	19.0
Lancashire (excl. N.W. Coast), Denbigh, Flints, and Cheshire	0.9	32.3	—	2.5	0.2	34.7	1.2	35.9
Yorkshire (excl. N.E. Coast and Sheffield) ..								
Lincolnshire	—	41.8	—	—	0.1	41.8	0.1	41.9
North-East Coast	0.5	58.4	—	1.1	0.3	58.8	1.5	60.3
Scotland	1.2	30.5	—	2.2	0.1	32.3	1.7	34.0
Staffs, Shrops, Worcs, and Warwicks	—	14.1	—	3.5	0.8	16.6	1.8	18.4
S. Wales and Mon.	1.5	75.6	6.4 (basic)	0.9	0.1	84.1	0.4	84.5
Sheffield (incl. small tonnage in Manchester) ..	7.7	31.3	—	10.6	0.3	48.3	1.6	49.9
North-West Coast	0.1	1.1	3.5 (acid)	0.4	—	5.0	0.1	5.1
Total	11.9	288.3	23.8	23.0	2.0	339.2	9.8	349.0
January, 1959	11.4	296.5	25.8	22.5	2.0	348.9	9.3	358.2
February, 1958	16.9	359.6	21.8	26.4	2.8	415.1	12.4	427.5

TABLE 3.—*Deliveries of Non-alloy and Alloy Finished Steel.*

Product.	1957.	1958.	1958.		1959.
			Jan. [4]	Dec. [4]	Jan.
Non-alloy steel:					
Ingots, blooms, billets and slabs [5]	5.0	4.6	5.7	6.3	5.2
Heavy rails ..	11.2	10.2	10.3	8.4	6.6
Sleepers	1.3	1.2	1.1	2.0	0.6
Fishplates and soleplates	0.8	0.7	0.8	0.3	0.5
Plates:					
(i) ⅜ in. and over	34.0	29.6	31.9	22.2	25.3
(ii) Under ⅜ in.	20.3	17.7	19.8	14.9	16.5
Other heavy prod.	53.0	41.8	53.8	26.4	33.4
Ferro-concrete bars	8.9	7.6	8.5	6.3	6.4
Wire rods ..	23.3	21.5	25.3	20.5	20.9
Arches, etc. ..	11.0	8.6	10.9	6.2	8.6
Other light sections	38.7	29.1	37.1	25.7	30.6
Bright steel bars ..	7.0	6.2	7.0	5.5	6.8
Hot-rolled strip ..	23.1	22.6	23.7	20.7	24.9
Cold-rolled strip ..	7.1	7.0	7.9	6.3	7.1
Sheets, incl. coated:					
(i) Hot-rolled ..	13.0	10.6	12.7	8.7	10.3
(ii) Cold-reduced	29.1	31.1	32.5	30.8	33.5
Tinplate ..	18.8	18.7	15.1	19.1	21.8
Blackplate	1.0	0.8	1.1	0.7	0.8
Tubes up to 16 in.	22.1	19.0	18.7	17.2	19.4
Tube, pipe fittings	0.5	0.4	0.4	0.3	0.4
Tyres, wheels, axles	5.1	4.5	5.4	3.1	3.3
Forgings (excl. drop)	3.1	2.6	2.8	2.1	2.5
Steel castings ..	4.6	4.2	4.7	3.3	3.6
Tool and magnet ..	0.3	0.2	0.3	0.2	0.2
Total	342.3	300.5	337.5	257.2	289.2
Alloy steel	17.8	16.1	17.8	13.5	16.2
Total deliveries from UK production [6] ..	360.1	316.6	355.3	270.7	305.4
Add: Imported finished steel ..	9.6	7.1	12.2	3.6	3.9
	369.7	323.7	367.5	274.3	309.3
Deduct: Intra-industry conversion [7] ..	48.2	41.2	48.2	36.0	44.2
Total deliveries: new material	321.5	282.5	319.3	238.3	265.1

TABLE 4.—*Production of Pig-iron and Ferro-alloys during February*, 1959.

District.	Furnaces in blast.	Hematite. [6]	Basic.	Foundry.	Forge.	Ferro-alloys.	Total.
Derbys, Leics, Notts, Northants, and Essex	20	1.1	19.7	16.3	0.3	—	37.4
Lancs (excl. N.W. Coast), Denbigh, Flints, and Cheshire ..	6	—	15.6	—	—	1.4	17.0
Yorkshire (excl. N.E. Coast and Sheffield) ..	—	—	—	—	—	—	—
Lincolnshire ..	8	—	40.5	—	—	—	40.5
North-East Coast	17	3.0	38.2	—	—	0.8	42.0
Scotland	6	0.5	13.8	1.1	—	—	15.4
Staffs, Shrops, Worcs, and Warwicks ..	5	—	4.8	1.4	—	—	6.2
S. Wales and Mon.	9	2.4	43.1	—	—	—	45.5
Sheffield	2	—	3.3	—	—	—	3.3
North-West Coast	8	13.4	—	0.2	—	0.9	14.5
Total ..	81	20.4	179.0	19.0	0.3	3.1	221.8
January, 1959 ..	84	19.2	183.7	23.5	0.1	2.2	228.7
February, 1958	94	25.7	214.8	27.2	0.4	4.6	272.7

[1] Used in non-food manufacturing industries.

[2] Weekly average of calendar month.

[3] Stocks, mainly ingots and semi-finished, at the end of the year and months shown.

[4] Five weeks, all tables.

[5] Other than for conversion into any other form of finished steel listed.

[6] Includes finished steel produced in the UK from imported ingots and semi-finished steel.

[7] Material for conversion into other products also listed in this table.